



Salmon Creek Stream Flow Monitoring Report

Water Year 2024

*Annex Creek/Salmon Creek Hydroelectric Project
(FERC Project No. 2307)*

Alaska Electric Light and Power Company
Juneau, Alaska

November 27, 2024

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1. INTRODUCTION AND PURPOSE

In October 2015, Alaska Electric Light & Power Company (AELP) requested an amendment to its license that would allow the operation of the stream gage to be performed by the licensee. By Order issued December 30, 2015, the Federal Energy Regulatory Commission (FERC) approved the amendment and stipulated that a new stream flow plan be developed after consultation with Alaska Department of Fish and Game (ADFG), National Marine Fisheries Service (NMFS), and the United State Fish and Wildlife Service (USFWS). AELP prepared a plan in consultation with ADFG, NMFS, and USFWS, as well as with the Alaska Department of Natural Resources (ADNR) Water Division and National Weather Service (NWS).

By Order issued August 9, 2016 the FERC approved the stream flow monitoring plan with a requirement to file an instream flow monitoring report biannually to the FERC, NMFS, USFWS and ADFG with the requirement changing to an annual report after four successful biannual reports. The report is to review operation of the gage, identify when supplemental water was released and include information on the operation of the supplemental water valve. The report is to be submitted for agency review, with a 30-day review and comment period, prior to filing with the FERC. Documentation of agency consultation should be included in the report.

Reports were submitted to FERC on April 19, 2017, August 16, 2017, February 20, 2018, and August 28, 2018. With the submission to FERC of the fourth report, AELP requested that the due date for the annual report be changed to December 1, 2019 to allow the entire water year to be analyzed in the report. This request was approved by FERC Order on October 9, 2018.

2. GAGE OPERATION

The stream gage started operation on April 27, 2016, taking level measurements on a 15-minute basis. This data is automatically distributed to www.aelp.com/About-Us/Salmon-Creek-Streamflow where it is available for public display. The page has multiple graph options for quick review of the data. Real-time flow data is supplied directly to the AELP Supervisory Control and Data Acquisition (SCADA) System where it is logged and monitored. Alarms are automatically generated for low flow conditions or for loss of communication with the sensor.

The communication path between the gage and the AELP SCADA system is through an AT&T cellular phone modem intended to provide a stable communications path. This communication link is continuously monitored by the AELP SCADA system at the AELP dispatch center which is manned 24 hours per day. The operators are trained to respond to all alarms, either by taking direct action or calling a technical specialist who can resolve the specific problem.

The cellular modem was reliable in water year 2024, with three short communication failures. Although the typical stream flow is well above the 9 CFS action level and the stream flow doesn't change rapidly, the AELP Operator opens the valve for any loss of communication event and leaves the valve open until communication is restored. This ensures that AELP remains in compliance with the license requirements.

Communication failures do not result in any data loss since the data is still stored locally on the datalogger, but it does result in a loss of real-time data to the AELP SCADA system.

Figures 1 through 4 below show the plots of daily mean discharge and field measured discharge for the by quarter for the water year. Discharge measurements were conducted to validate discharges for the 2024 Water Year. Calibration measurements ranged from 20 to 90 CFS.

Ed Neal with Alaska Hydrosience provided a new rating table for the stream on January 22, 2019, and the rating was continued in use, with slight shift adjustments, until a large peak discharge on Dec. 1, 2020. This large peak resulted in channel fill through the gage reach. Following that event, another rating was constructed based on seven discharge measurements and the highest recorded measurements conducted by the U.S. Geological Survey at this same site and gage datum. Alaska Hydrosience performs discharge measurements of the stream several times a year and adjusts the rating curve as necessary to provide accurate representation of the streamflow. A copy of the revised rating curve dated October 6, 2023, is included in Appendix B.

A table of the Daily Mean Discharge for the months of October 2016 through September 2024 is included in Appendix A.

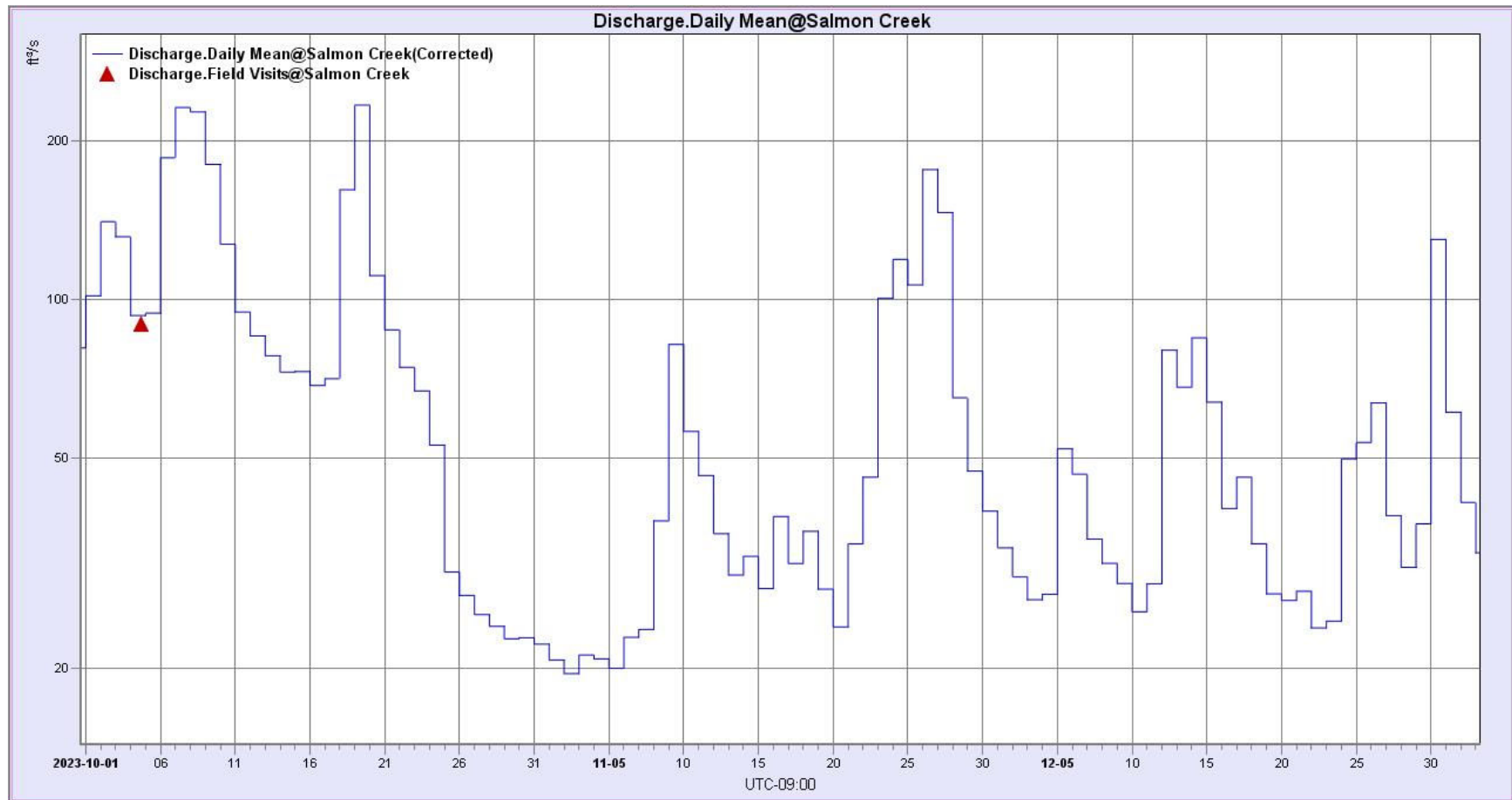


Figure 1 – Fourth Quarter 2023 Corrected Discharge

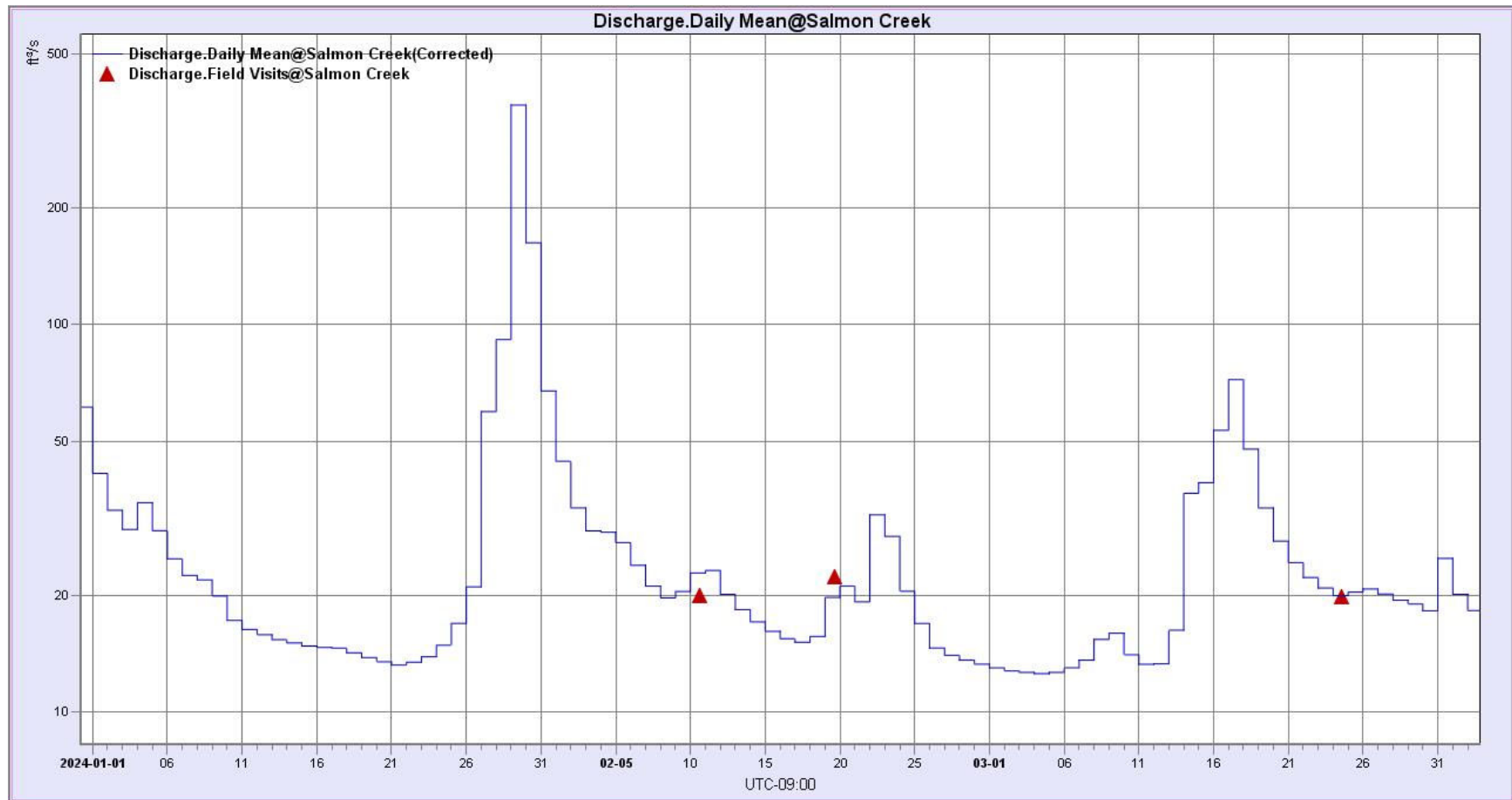


Figure 2 – First Quarter 2024 Corrected Discharge

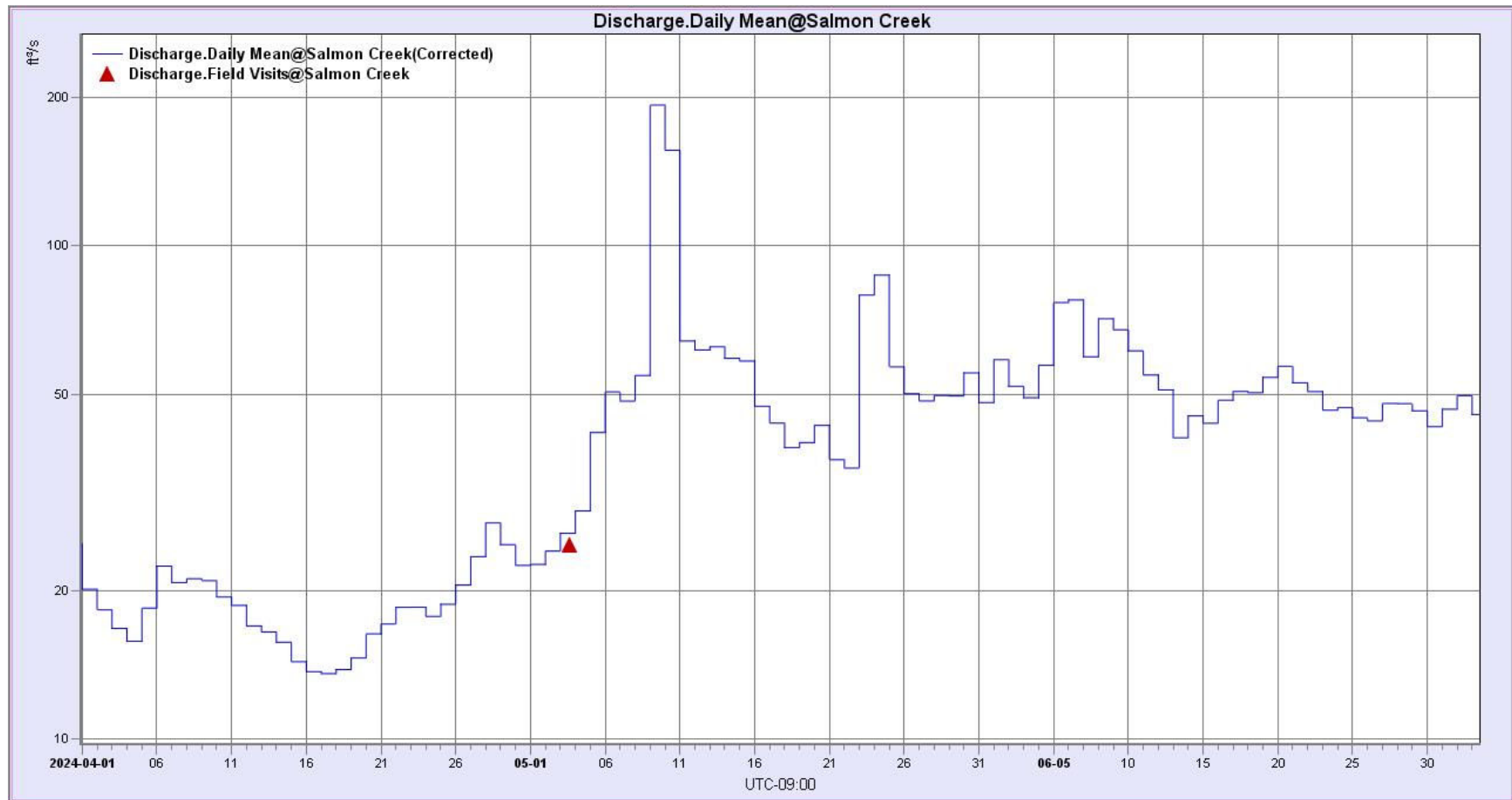


Figure 3 – Second Quarter 2024 Corrected Discharge

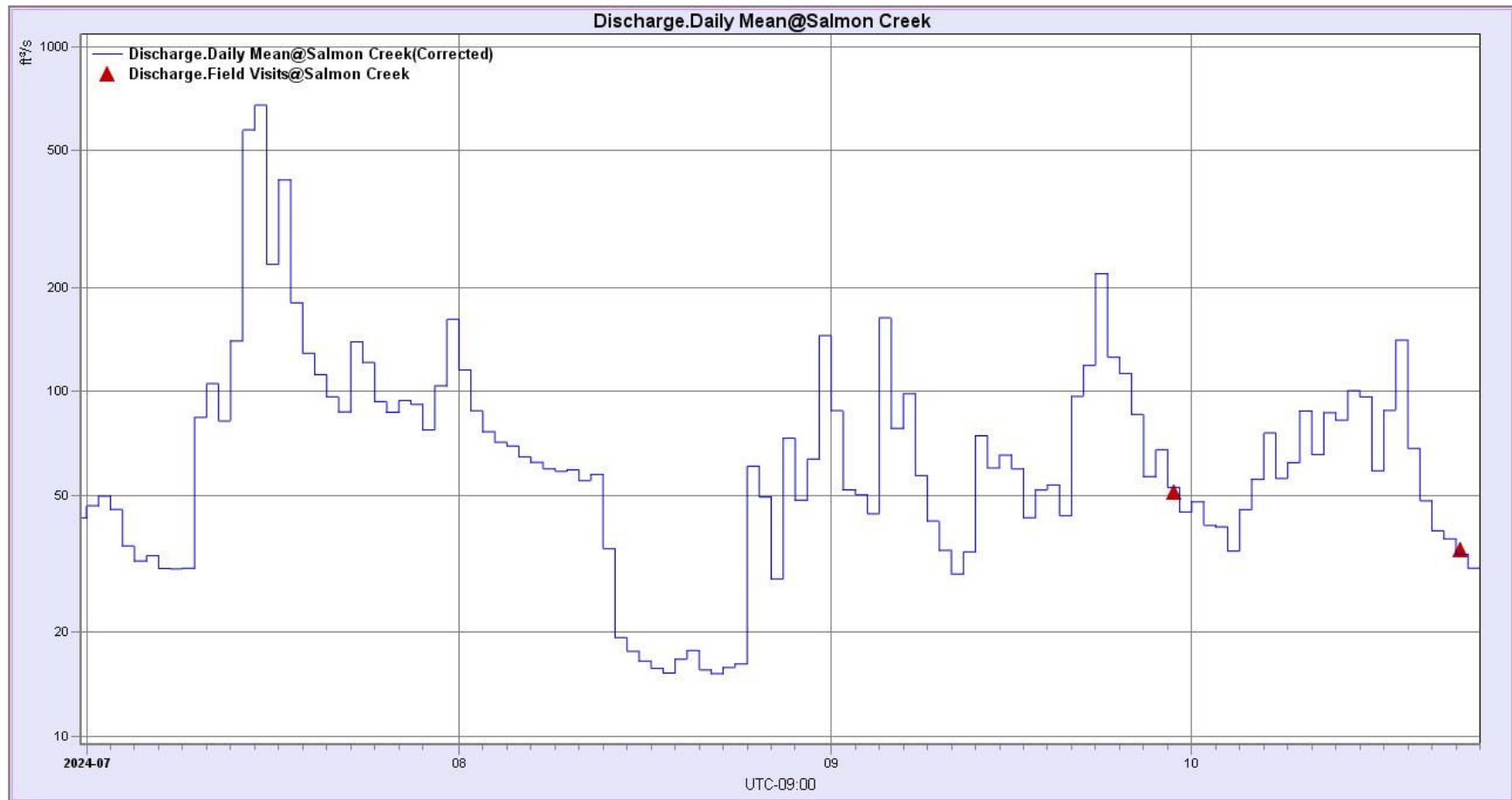


Figure 4 – Third Quarter 2024 Corrected Discharge

3. SUPPLEMENTAL VALVE OPERATION

The supplemental water valve is a 6" valve tapped off the penstock at the base of the dam. The valve discharges water directly into the natural drainage. Operation of the valve is performed remotely by the AELP System Operator who also has real-time indication of the streamflow. When the flow drops to 9CFS, an alarm is generated, and the Operator opens the valve and logs the operation.

The valve is either open or closed. There are no intermediate positions. The Operator has feedback on the valve position, provided by limit switches which show the valve position as well as an analog signal which reflects valve position. In addition to valve position, there is a flowmeter on the outlet of the valve. The amount of flow through the valve when open varies with the reservoir elevation. The valve has been sized to ensure a minimum of 3CFS of flow at minimum reservoir elevation, so typically more than 3 CFS is discharged to the stream.

Station service at the valve house located at the base of the dam is provided by a small hydroelectric DC generator. This power is used for monitoring, valve operation, and battery charging. The output of the turbine is discharged into the stream at the base of the dam.

4. SUPPLEMENTAL VALVE RELEASE

The supplemental valve was operated 5 times in water year 2024.

It was operated only once for low stream flow as indicated by stream flow measurement and one other time for low flow indicated by extreme cold, which resulted in inaccuracies in the stream flow measurement. In July of 2024 the valve was opened to help mitigate high reservoir level. The remainder of the valve operations were due to short communications failures.

In June of 2024 the valve was open for less than 15 minutes due to a communication failure. The valve flow is logged on a 15-minute interval. Due to the timing, flow through the valve was logged during operation of the valve and not when it was fully open, so full flow was not recorded.

Date Open	Stream Flow	Date Closed	Release Flow (CFS)	Reason
1/21/24 07:24 AM	9.05	1/26/24 02:12 PM	4.20	Low flow
3/3/24 08:26 AM	62.17	3/14/24 01:57 PM	4.02	Low flow (ice)
6/23/24 04:26	46.42	6/23/24 04:41	3.26	Comm failure
7/15/24 10:30 AM	667.87	7/29/24 08:34 AM	4.3	High reservoir
8/7/24 04:44 AM	55.41	8/7/24 08:35 AM	4.31	Comm failure

5. AGENCY CONSULTATION

A copy of the report with a request for consultation was sent out on October 25, 2024, by Bryan Farrell with AELP to ADFG, USFWS and NMFS by e-mail.

A copy of the request for consultation and comments received are included in Appendix E.

APPENDIX A: DAILY DISCHARGE TABLE OCTOBER 2016-SEPTEMBER 2024

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Salmon Creek

Identifier: Discharge.Daily Mean@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Year: Oct. 2016 to Sept. 2017

Aggr:

39

Min:

8.2

Max:

560

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	25	11	19	12	13	12	34	34	64	63	21	150
2	22	12	67	12	12	12	21	37	62	92	19	96
3	20	24	98	12	11	12	16	39	57	110	18	59
4	19	33	38	11	11	11	13	32	46	70	17	120
5	17	59	25	11	12	11	17	27	45	52	16	76
6	16	31	20	11	13	11	17	25	59	47	15	56
7	15	27	19	9.9	12	11	14	25	68	40	14	75
8	14	51	17	9.5	11	10	13	34	78	36	13	80
9	13	64	15	9	10	10	19	69	67	54	12	140
10	13	76	14	8.6	11	10	16	42	48	46	12	120
11	12	120	13	8.3	19	9.8	16	46	39	49	12	72
12	12	95	14	8.8	31	9.6	18	55	37	46	14	57
13	12	65	16	16	53	9.4	22	50	36	69	16	46
14	11	63	15	43	74	9.2	20	49	33	82	33	39
15	11	43	14	45	77	9	18	43	35	54	30	34
16	12	33	13	130	43	8.7	18	44	51	57	69	31
17	17	27	15	55	27	8.6	17	48	77	46	130	32
18	37	23	17	29	21	8.4	16	49	49	37	110	27
19	32	20	19	34	17	8.3	13	81	45	33	73	23
20	31	18	20	22	15	8.3	12	81	53	29	73	21
21	23	16	24	17	14	8.2	13	300	43	27	110	20
22	26	16	15	15	13	8.2	18	150	42	37	150	27
23	25	16	12	14	12	8.3	22	94	37	39	75	31
24	19	15	11	15	11	8.2	25	73	42	30	51	68
25	16	14	10	23	11	8.2	32	59	40	27	68	50
26	15	14	12	22	12	8.2	30	58	37	35	95	74
27	14	14	13	27	13	8.6	41	52	41	76	70	150
28	13	13	15	33	13	12	62	47	36	48	55	130
29	12	27	11	25		16	38	61	34	35	43	60
30	12	30	13	18		13	29	64	50	29	42	41
31	11		12	15		42		62		24	100	
Aggr	18	36	21	23	21	11	22	62	48	49	51	67
Min	11	11	10	8.3	10	8.2	12	25	33	24	12	20
Max	37	120	98	130	77	42	62	300	78	110	150	150

Salmon Creek - Daily Mean Discharge

Identifier: Discharge.Daily Mean@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Year: Oct. 2017-Sept. 2018

Aggr: 28

Min: 7.8

Max: 210

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	33	42	12	10	14	8.6	8.7	37	31	31	12	43
2	28	35	10	25	14	8.2	8.6	50	31	24	11	33
3	39	32	11	48	13	8.2	8.5	28	29	23	9.7	27
4	35	29	27	41	13	8	8.3	56	33	21	12	23
5	41	26	20	45	12	7.8	8.3	100	35	20	11	20
6	75	24	24	35	11	8	8.4	71	31	18	11	18
7	47	22	25	28	11	7.8	8.7	54	31	17	14	16
8	60	20	52	18	10	7.9	9.9	53	29	15	23	15
9	60	19	120	16	9.4	7.9	18	63	26	14	100	14
10	40	17	72	15	9.1	8.1	22	64	33	16	53	13
11	31	16	200	13	9.7	12	21	79	38	20	30	12
12	26	15	95	18	10	16	16	110	32	20	25	11
13	23	14	130	20	10	25	15	75	29	16	39	11
14	24	13	210	57	10	22	15	56	31	15	100	10
15	42	12	83	63	9.9	16	14	37	27	32	38	9.9
16	49	11	70	50	9.8	15	13	31	28	100	28	9.5
17	40	11	52	35	9.6	14	12	30	44	40	26	9.5
18	32	11	38	26	9.5	12	16	36	40	28	21	12
19	27	11	31	22	9.3	14	28	39	35	24	18	12
20	35	10	28	20	9.2	16	20	41	33	20	16	11
21	33	10	24	17	9	13	14	77	31	18	16	11
22	27	10	21	16	8.9	11	15	85	25	17	21	11
23	37	10	19	15	8.9	11	49	49	21	15	23	16
24	37	9.9	18	16	8.7	9.8	41	43	20	14	26	12
25	28	9.5	17	17	8.7	9.9	27	42	18	13	57	18
26	57	9.2	16	16	8.4	10	36	66	19	12	35	32
27	560	9.2	15	16	8.4	10	36	69	20	11	36	18
28	110	9.1	14	15	8.3	9.9	24	51	18	11	96	14
29	61	12	14	15		9.5	19	42	30	10	50	12
30	52	18	12	15		9.1	17	37	39	9.5	34	11
31	54		11	15		8.8		34		9.9	43	
Aggr	59	17	48	25	10	11	19	55	30	21	33	16
Min	23	9.1	10	10	8.3	7.8	8.3	28	18	9.5	9.7	9.5
Max	560	42	210	63	14	25	49	110	44	100	100	43

Salmon Creek - Daily Mean Discharge

Identifier: Discharge.Daily Mean@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Year: Oct. 2018-Sept. 2019

Aggr: 32

Min: 7.4

Max: 600

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	9.9	23	20	120	19	9.5	15	14	39	14	13	10
2	9.3	22	18	50	18	9.2	15	17	36	13	12	14
3	11	20	17	29	16	8.9	15	26	31	13	11	20
4	12	19	17	21	16	8.8	16	31	37	12	10	14
5	16	17	16	20	16	8.7	14	44	31	12	9.9	12
6	17	16	15	18	16	8.5	13	78	26	11	9.5	10
7	14	15	14	18	15	8.4	14	130	27	13	9.2	12
8	28	22	16	18	15	8.3	19	120	28	14	8.7	11
9	19	34	30	17	15	8.4	18	110	35	14	8.3	10
10	16	27	42	14	14	9.1	20	71	32	13	8.1	10
11	26	64	56	15	14	9.4	17	52	81	13	7.8	9.8
12	19	40	32	15	13	9.5	17	37	54	12	7.7	10
13	28	46	25	35	13	10	15	33	36	12	7.5	29
14	160	58	20	61	12	11	13	31	29	12	7.4	23
15	190	38	18	33	12	11	12	37	30	11	7.7	13
16	81	30	18	26	11	15	12	40	45	13	7.4	12
17	100	79	25	21	11	29	13	46	52	12	13	12
18	56	110	24	18	11	76	45	41	69	14	10	18
19	71	83	31	16	11	45	39	38	45	13	8.6	33
20	56	70	23	15	11	38	24	39	34	14	7.9	330
21	42	50	19	16	11	40	19	48	32	12	7.6	340
22	47	37	17	15	10	41	26	41	30	11	9.5	99
23	46	31	16	13	10	42	25	35	28	11	21	67
24	37	27	15	16	9.8	35	20	31	25	11	27	170
25	49	26	14	47	9.6	27	17	31	22	11	35	130
26	44	37	13	160	9.6	22	16	40	21	14	32	94
27	39	32	16	55	9.6	20	14	43	24	15	52	57
28	31	26	16	35	9.6	19	13	41	22	40	26	41
29	27	24	14	33		18	13	33	17	19	17	33
30	31	22	13	35		17	13	30	16	13	13	34
31	27		23	30		16		35		12	11	
Aggr	44	38	21	33	13	21	18	47	34	14	14	56
Min	9.3	15	13	13	9.6	8.3	12	14	16	11	7.4	9.8
Max	190	110	56	160	19	76	45	130	81	40	52	340

Identifier: Discharge.Daily Mean@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Daily Mean Discharge 2020 WY-Salmon Creek

Year: 2020 Water Year

Aggr: 48

Min: 7

Max: 300

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	270	51	25	56	11	18	7.4	56	84	48	46	85
2	160	47	47	35	12	17	7.2	46	83	55	44	89
3	70	49	29	26	13	15	7.4	61	110	51	73	100
4	49	61	23	21	13	12	7.2	64	83	55	120	62
5	62	51	24	18	15	11	7.1	53	60	45	59	45
6	590	44	23	17	12	12	7.2	46	53	36	41	35
7	86	79	19	16	11	12	7	48	82	33	83	32
8	52	45	21	15	14	12	8.3	52	93	45	120	34
9	40	31	21	13	13	14	7.8	83	66	61	170	32
10	38	26	23	12	68	11	7.4	130	64	56	260	28
11	66	25	26	12	32	11	7.3	110	64	42	140	24
12	53	24	23	12	23	11	7.4	78	61	41	110	22
13	41	44	20	12	18	9.7	8.5	71	66	36	100	19
14	32	67	18	12	14	9.1	17	72	93	83	98	18
15	34	66	16	12	13	10	19	70	61	61	110	16
16	38	100	15	12	11	9.8	26	70	70	41	100	15
17	33	270	14	12	12	9.5	32	70	69	36	110	15
18	39	89	16	12	13	9.4	35	63	88	79	93	15
19	37	60	16	12	13	9.2	39	89	96	110	87	14
20	31	180	15	12	16	9.2	44	100	120	190	81	14
21	26	190	13	11	21	9.1	68	67	87	85	80	14
22	23	210	13	11	14	9.4	130	59	68	55	76	15
23	62	120	18	15	11	9	100	62	60	48	78	15
24	60	74	16	15	12	8.7	65	100	56	41	86	15
25	46	52	17	15	13	8.6	52	87	60	93	91	15
26	34	39	41	27	17	8.8	55	72	110	300	73	18
27	31	31	27	17	30	8.8	63	53	72	130	47	74
28	25	27	43	12	29	8.3	92	48	60	66	44	100
29	33	24	29	30	19	7.8	78	58	68	53	39	41
30	41	22	120	17		7.5	70	61	52	49	61	31
31	32		72	13		7.5		61		43	97	
Aggr	72	74	27	17	18	10	36	70	75	70	91	35
Min	23	22	13	11	11	7.5	7	46	52	33	39	14
Max	590	270	120	56	68	18	130	130	120	300	260	100

Identifier: Discharge.1@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Daily Mean Discharge 2021 WY Salmon Creek

Year: 2021 Water Year

Aggr: 62

Min: 9.4

Max: 1300

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	27	94	590	35	30	20	13	74	320	94	31	32
2	120	62	620	34	30	14	11	50	250	89	28	48
3	77	40	200	34	29	11	12	42	270	85	25	63
4	76	32	190	34	30	13	11	63	150	83	29	66
5	110	26	210	36	29	13	13	59	110	86	33	64
6	73	23	250	38	29	14	11	60	100	89	33	54
7	50	21	250	37	28	12	12	80	91	83	35	44
8	39	22	190	37	28	11	11	73	83	85	34	50
9	33	32	120	36	27	11	12	72	86	90	63	46
10	29	23	98	46	26	11	10	60	88	81	69	46
11	29	20	89	54	26	11	9.8	69	78	75	55	76
12	29	26	83	56	25	10	11	67	71	130	81	66
13	28	28	77	46	24	9.8	18	59	69	150	350	65
14	25	22	74	42	24	9.6	31	91	72	170	110	63
15	22	19	71	74	24	9.7	23	130	170	100	120	71
16	20	17	69	60	25	11	30	91	110	89	87	72
17	18	16	68	74	26	14	49	60	85	90	81	53
18	17	15	62	120	26	11	80	50	83	84	110	41
19	17	14	53	100	28	11	68	50	76	75	94	34
20	17	14	49	60	28	10	62	52	110	72	77	38
21	15	14	45	49	41	9.9	51	66	180	74	70	83
22	14	14	42	44	30	9.6	39	120	92	64	65	63
23	14	15	55	41	19	12	32	120	74	45	61	60
24	13	17	48	39	11	12	32	78	250	44	47	100
25	14	16	43	37	11	11	33	65	190	40	40	55
26	75	31	40	35	11	11	36	65	180	32	30	42
27	37	19	38	32	12	13	35	59	140	30	31	37
28	29	24	37	32	30	12	29	56	130	29	95	35
29	25	27	38	32		10	61	93	120	27	70	31
30	25	24	37	32		12	84	95	110	28	49	34
31	200		36	31		23		350		32	38	
Aggr	42	26	120	47	25	12	31	81	130	76	69	54
Min	13	13	34	30	9.5	9.4	9.5	39	63	24	23	30
Max	410	140	1300	230	52	30	100	890	780	220	1000	160

Identifier: Discharge.Daily Mean@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Daily Mean Discharge 2022 WY Salmon Creek

2022 Water Year												
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	120	23	19	8.7	21	16	20	26	92	61	68	84
2	180	22	17	8.2	19	15	18	45	110	62	140	87
3	73	32	15	7.9	18	14	19	54	110	67	110	91
4	52	28	13	7.7	33	12	17	43	100	67	87	110
5	41	24	13	7.7	58	12	15	32	90	70	120	86
6	29	22	13	7.6	88	34	13	26	110	69	200	62
7	34	20	13	7.6	66	21	14	23	96	57	150	38
8	120	18	12	7.4	91	16	14	23	86	60	98	34
9	100	17	12	7.5	140	14	13	28	78	53	82	36
10	67	16	12	10	72	13	12	35	85	57	74	34
11	120	15	10	55	47	22	10	29	77	69	70	29
12	150	24	9.3	36	86	18	11	26	75	49	67	26
13	140	23	11	12	44	16	12	26	90	43	66	24
14	150	18	12	22	31	13	12	27	91	39	69	26
15	80	16	13	22	26	13	12	27	68	37	80	51
16	55	17	11	20	28	17	12	28	80	38	69	34
17	42	32	11	14	29	21	11	29	83	60	140	28
18	36	25	11	11	53	19	11	28	73	94	96	27
19	31	19	11	10	39	16	11	33	67	56	78	24
20	29	15	10	11	28	14	11	41	78	54	70	22
21	30	34	10	190	21	15	11	48	75	70	66	25
22	46	38	9.8	310	19	29	12	52	61	59	63	53
23	44	24	9.6	100	17	26	13	58	58	71	62	110
24	34	25	9.4	61	15	21	17	63	66	130	61	67
25	28	88	9.3	82	16	17	21	46	70	110	61	62
26	27	43	9.1	42	17	16	31	40	73	84	59	220
27	38	29	8.9	34	18	14	28	42	73	58	89	170
28	48	24	8.8	44	18	13	24	56	85	120	100	64
29	34	20	8.7	72		20	20	62	82	140	240	110
30	30	19	8.5	42		23	19	62	72	79	130	330
31	26		8.6	28		22		70		97	99	
Aggr	66	26	11	42	41	18	16	40	82	70	96	72
Min	26	15	8.5	7.4	15	12	10	23	58	37	59	22
Max	180	88	19	310	140	34	31	70	110	140	240	330

Identifier: Discharge.Daily Mean@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Daily Mean Discharge 2023 WY - Salmon Creek

Year: 2023 Water Year

Aggr: 42

Min: 7.3

Max: 370

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	490	79	18	16	17	8.3	12	46	68	67	32	29
2	140	54	17	21	15	9.2	11	120	61	60	25	30
3	97	35	16	13	14	10	11	150	61	53	22	28
4	82	32	15	12	13	10	10	62	59	53	21	37
5	74	27	14	11	13	11	12	46	56	49	21	30
6	69	23	14	10	16	9.9	20	43	56	48	21	25
7	64	21	17	15	13	7.7	25	45	59	54	24	27
8	67	20	19	16	12	7.3	21	44	67	55	29	34
9	120	19	14	12	11	7.6	29	43	74	45	23	29
10	81	19	12	10	12	9	21	48	68	39	38	25
11	83	18	11	9.7	13	9.8	15	59	65	35	34	25
12	120	27	12	9.3	28	8.9	13	84	98	33	200	43
13	490	46	11	8.9	27	8.7	13	93	62	33	110	40
14	150	120	15	9.4	16	8.1	12	81	51	36	59	100
15	180	82	18	14	14	7.9	12	75	51	38	95	82
16	110	53	18	13	13	10	14	70	91	38	140	47
17	120	37	13	15	12	11	13	78	100	47	71	96
18	110	30	12	13	13	10	13	88	72	35	50	200
19	150	27	12	16	14	13	13	100	72	40	40	99
20	140	34	12	71	12	12	15	100	74	35	35	110
21	160	83	11	43	10	12	19	77	66	35	30	370
22	100	87	11	25	11	11	19	59	62	35	27	250
23	82	81	11	26	11	11	21	53	63	52	25	140
24	73	92	11	42	9	11	38	52	77	37	23	110
25	67	51	11	160	8.7	10	26	73	77	29	21	92
26	130	40	10	89	8.5	10	22	130	120	26	22	82
27	160	31	9.5	57	8.4	11	32	100	93	24	20	110
28	130	25	8.7	35	8.3	11	29	180	81	24	20	120
29	93	21	11	26		11	31	130	84	24	19	87
30	170	19	11	22		11	45	120	95	24	19	81
31	110		12	19		11		83		23	24	
Aggr	140	44	13	28	13	10	20	82	73	40	43	86
Min	64	18	8.7	8.9	8.3	7.3	10	43	51	23	19	25
Max	490	120	19	160	28	13	45	180	120	67	200	370

Identifier: Discharge.1@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Daily Mean Discharge 2024 WY - Salmon Creek

Year: 2024 Water Year

Aggr: 53 Min: 13 Max: 1100

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	100	21	34	41	44	13	20	23	59	47	120	88
2	140	20	30	33	34	13	18	24	52	50	88	52
3	130	21	27	30	29	13	17	26	49	45	76	50
4	93	21	28	35	29	13	16	29	57	36	71	44
5	94	20	52	29	27	13	18	42	77	32	69	160
6	190	23	47	25	24	13	22	51	78	33	65	78
7	230	24	35	23	21	14	21	48	60	31	62	98
8	230	38	32	22	20	15	21	55	71	31	60	57
9	180	82	29	20	20	16	21	190	68	31	59	42
10	130	56	26	17	23	14	19	160	61	84	59	35
11	95	46	29	16	23	13	19	64	55	110	55	30
12	85	36	80	16	20	13	17	62	51	82	57	34
13	78	30	68	15	18	16	16	62	41	140	35	74
14	73	33	85	15	17	37	16	59	45	570	19	60
15	73	28	64	15	16	39	14	58	44	680	18	65
16	69	39	40	15	15	53	14	47	49	230	17	60
17	71	32	46	15	15	72	14	44	51	410	16	43
18	160	36	34	14	16	48	14	39	50	180	15	52
19	230	28	28	14	20	34	15	40	54	130	17	54
20	110	24	27	13	21	28	16	43	57	110	18	44
21	88	34	28	13	19	24	17	37	53	96	16	97
22	74	46	24	13	32	22	18	35	51	87	15	120
23	67	100	25	14	28	21	18	79	46	140	16	220
24	53	120	50	15	20	20	18	87	47	120	16	130
25	30	110	54	17	17	20	19	57	45	93	61	110
26	28	180	64	21	15	21	20	50	44	87	49	86
27	25	150	39	60	14	20	23	48	48	94	29	57
28	24	65	31	91	14	19	27	50	48	92	73	68
29	23	47	38	370	13	19	25	50	46	77	48	53
30	23	40	130	160		18	22	55	43	100	64	45
31	22		61	67		25		48		160	150	
Aggr	97	51	45	41	22	23	19	57	53	140	49	73
Min	21	19	22	13	13	13	13	22	36	28	14	27
Max	470	430	220	840	55	110	28	610	93	1100	250	710

APPENDIX B: STREAM RATING CURVE

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Rating Curve

Rating #3

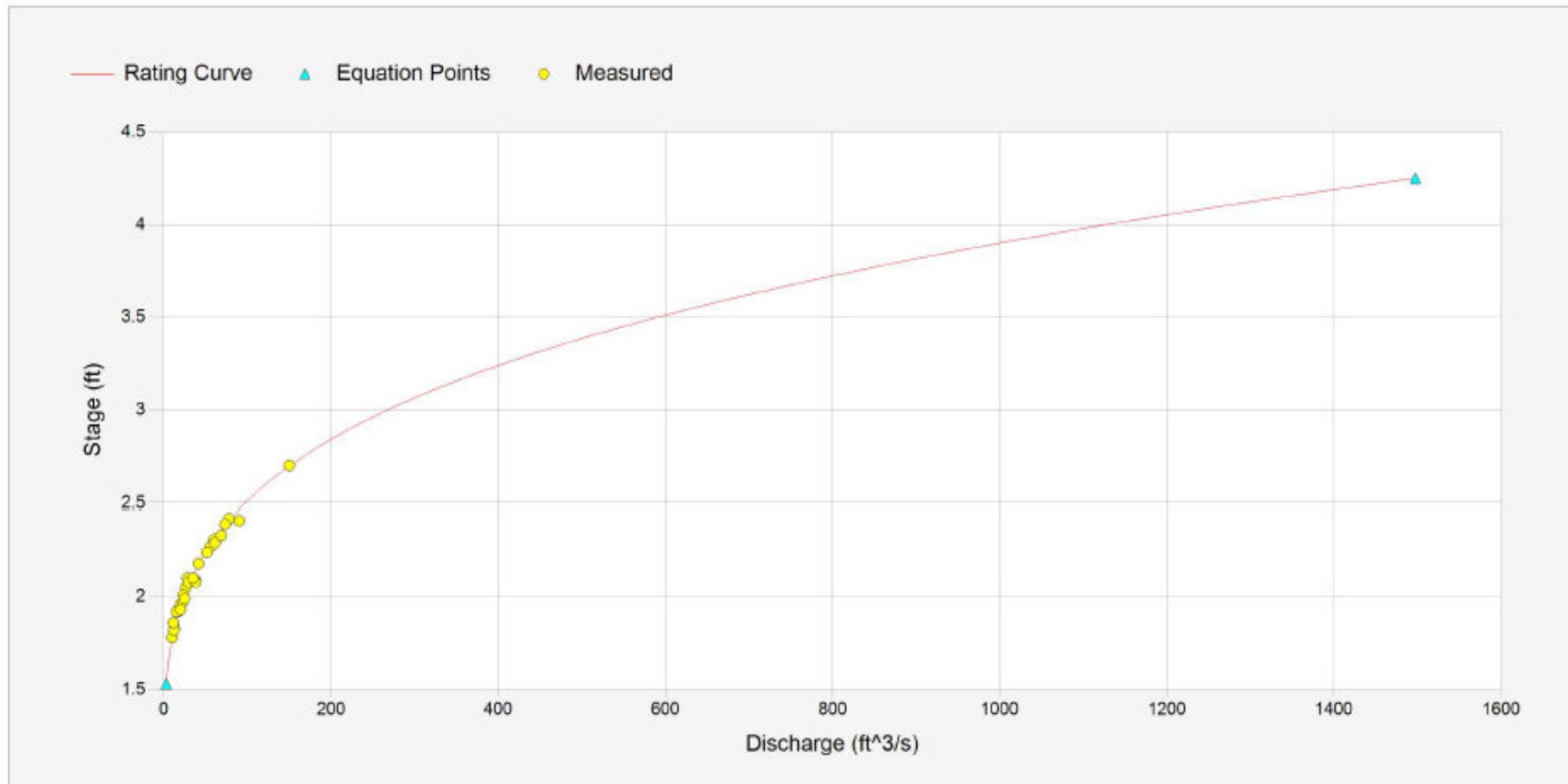
Label: Salmon Creek

Description: Site ID-Salmon Creek

Curve on: October 25, 2024

Curve Start Date: December 1, 2020

Location: Salmon Creek Juneau



STATION NUMBER Salmon Creek Salmon Creek Juneau SOURCE AGENCY:
 LATITUDE 49.28 LONGITUDE -123.11
 Date Processed: 2021-10-11 08:18:25 UTC-09:00 By admin
 Rating for Discharge (ft³/s)
 Created by admin on 2021-10-07 18:23:19 [UTC], Updated by admin on 2021-10-09 19:46:22 [UTC]
 Remarks:

Offset1: 0.98		EXPANDED CAQRating TABLE									
Stage (m)	Discharge (ft ³ /s)										DIFF IN Q PER .1 UNITS
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09	
1.50				2.560*	2.730	2.909	3.095	3.290	3.494	3.706	1.954
1.60	3.928	4.159	4.400	4.651	4.912	5.183	5.465	5.758	6.061	6.377	2.776
1.70	6.704	7.042	7.393	7.757	8.133	8.522	8.924	9.340	9.769	10.21	3.966
1.80	10.67	11.14	11.63	12.13	12.65	13.18	13.73	14.30	14.88	15.48	5.430
1.90	16.10	16.73	17.39	18.06	18.74	19.45	20.18	20.92	21.69	22.47	7.180
2.00	23.28	24.10	24.95	25.82	26.71	27.62	28.56	29.51	30.49	31.49	9.240
2.10	32.52	33.57	34.64	35.74	36.86	38.01	39.19	40.39	41.61	42.87	11.630
2.20	44.15	45.45	46.79	48.15	49.54	50.96	52.41	53.89	55.40	56.93	14.350
2.30	58.50	60.10	61.73	63.40	65.09	66.82	68.58	70.37	72.19	74.06	17.450
2.40	75.95	77.88	79.84	81.84	83.88	85.95	88.06	90.20	92.38	94.60	20.910
2.50	96.86	99.16	101.5	103.9	106.3	108.7	111.2	113.8	116.4	119.0	24.740
2.60	121.6	124.3	127.1	129.9	132.7	135.6	138.5	141.5	144.5	147.6	29.100
2.70	150.7	153.8	157.0	160.3	163.6	166.9	170.3	173.8	177.3	180.8	33.700
2.80	184.4	188.0	191.7	195.5	199.3	203.2	207.1	211.0	215.0	219.1	38.800
2.90	223.2	227.4	231.7	236.0	240.3	244.7	249.2	253.7	258.3	263.0	44.500
3.00	267.7	272.4	277.3	282.1	287.1	292.1	297.2	302.3	307.5	312.8	50.400
3.10	318.1	323.5	329.0	334.5	340.1	345.8	351.5	357.3	363.2	369.1	57.000
3.20	375.1	381.2	387.3	393.5	399.8	406.2	412.6	419.1	425.7	432.3	64.000
3.30	439.1	445.9	452.7	459.7	466.7	473.8	481.0	488.3	495.6	503.0	71.400
3.40	510.5	518.1	525.8	533.5	541.4	549.3	557.3	565.3	573.5	581.7	79.600
3.50	590.1	598.5	607.0	615.5	624.2	633.0	641.8	650.8	659.8	668.9	88.000
3.60	678.1	687.4	696.8	706.3	715.8	725.5	735.3	745.1	755.1	765.1	97.100
3.70	775.2	785.5	795.8	806.2	816.8	827.4	838.1	848.9	859.9	870.9	106.800
3.80	882.0	893.3	904.6	916.0	927.6	939.2	951.0	962.8	974.8	986.8	117.000
3.90	999.0	1011	1024	1036	1049	1062	1074	1087	1100	1114	128.000
4.00	1127	1140	1154	1167	1181	1195	1209	1223	1237	1251	139.000
4.10	1266	1280	1295	1310	1325	1340	1355	1370	1386	1401	151.000
4.20	1417	1433	1449	1465	1481						

*** indicates a rating descriptor point

ID	Starting Date	Ending Date	Aging	Comments
ah01	2020-12-01 16:00:00 [UTC-09:00]		0	

APPENDIX C: PLOTS OF 15 MINUTE DATA

FOURTH QUARTER 2023 – THIRD QUARTER 2024

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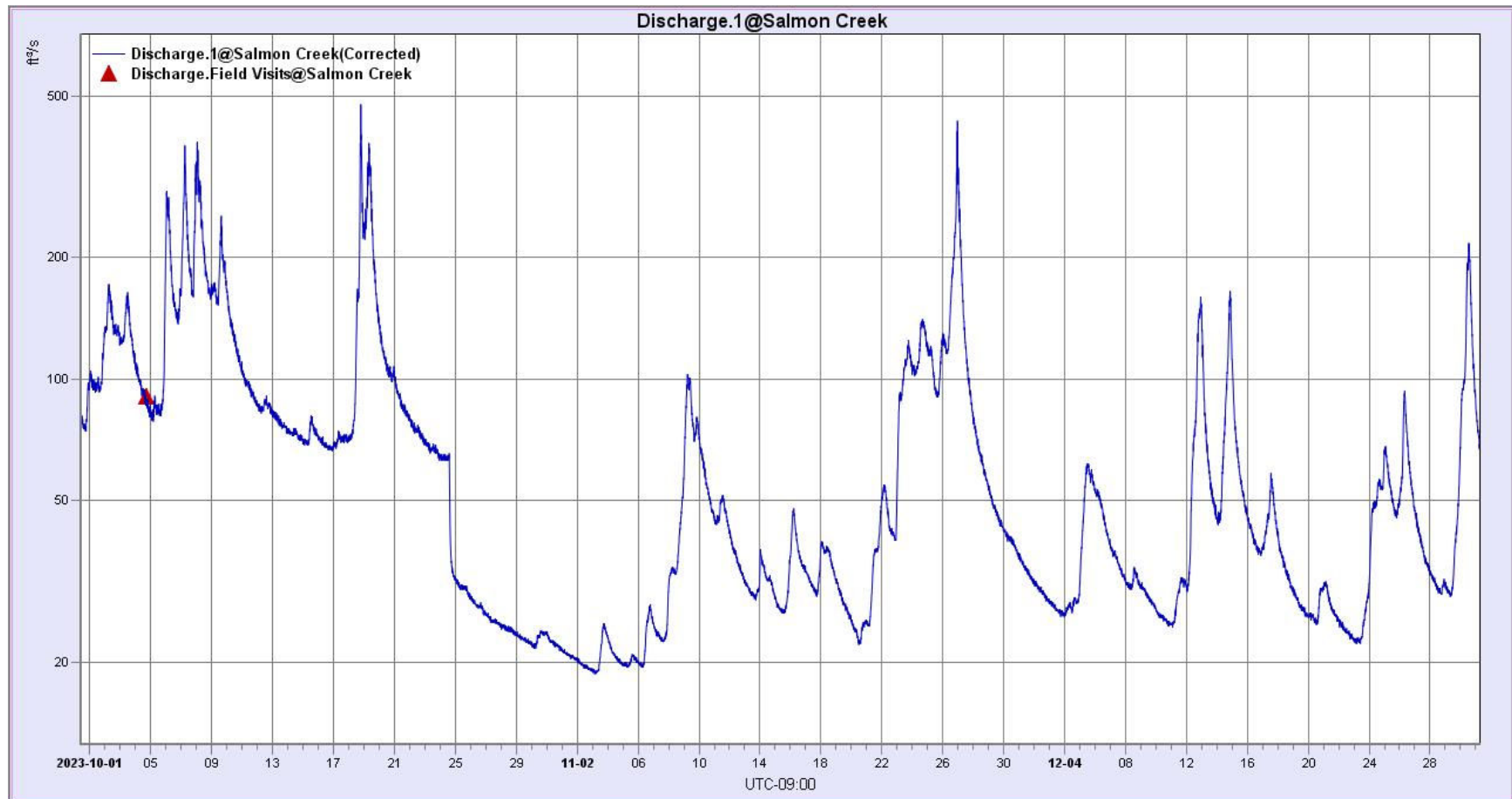


Figure C1 – Fourth Quarter 2023

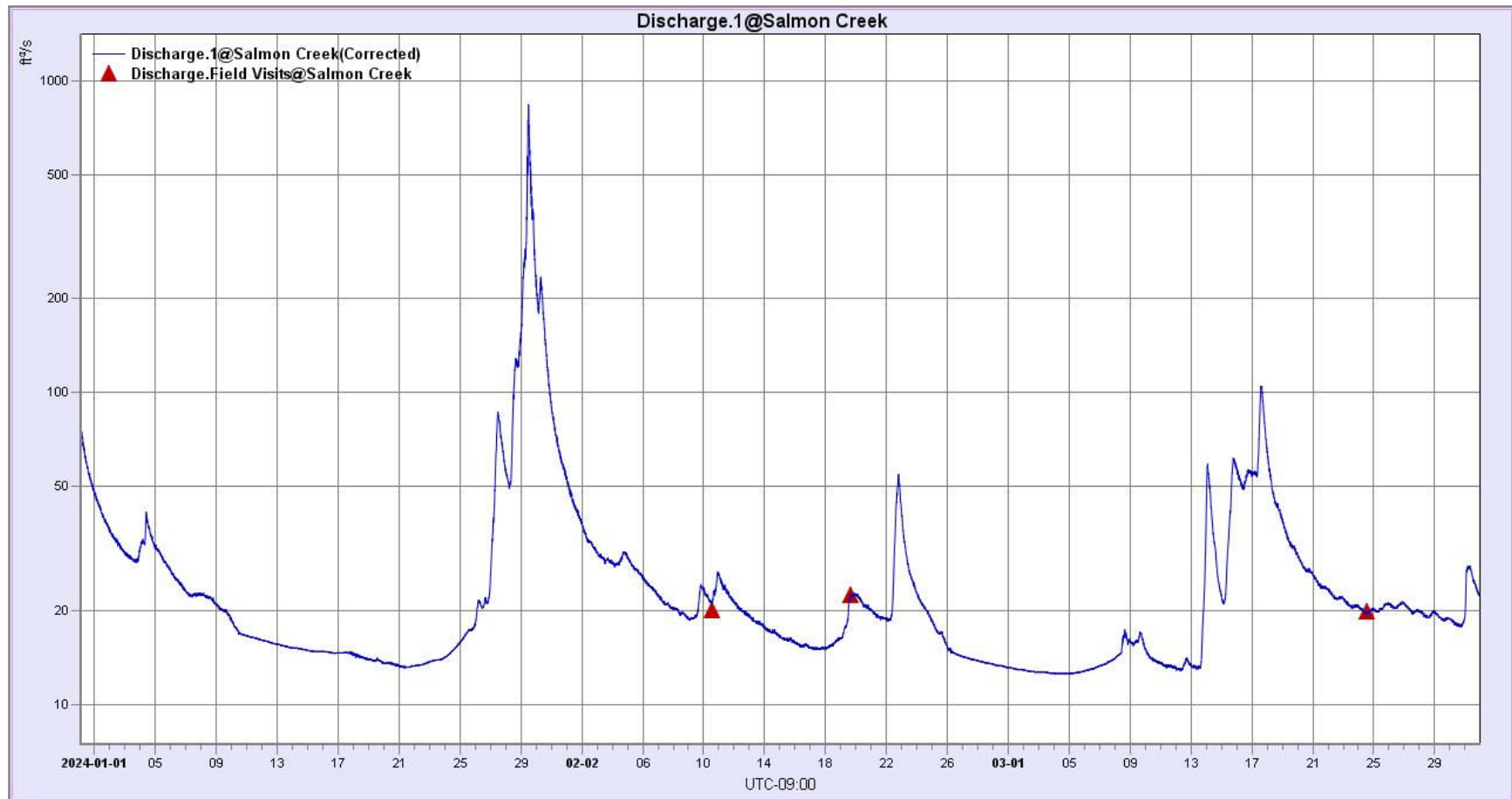


Figure C2 – First Quarter 2024

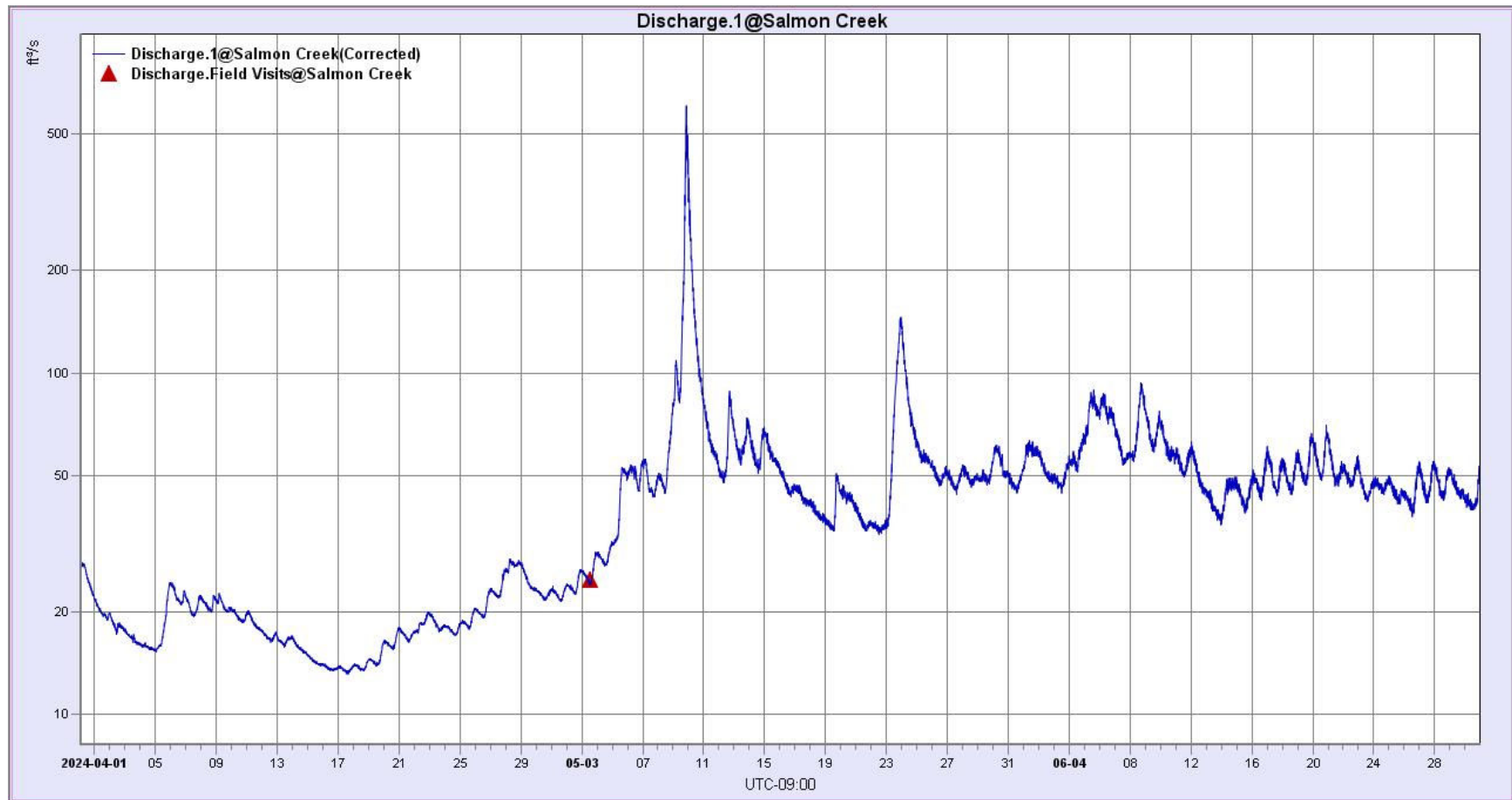


Figure C3 – Second Quarter 2024

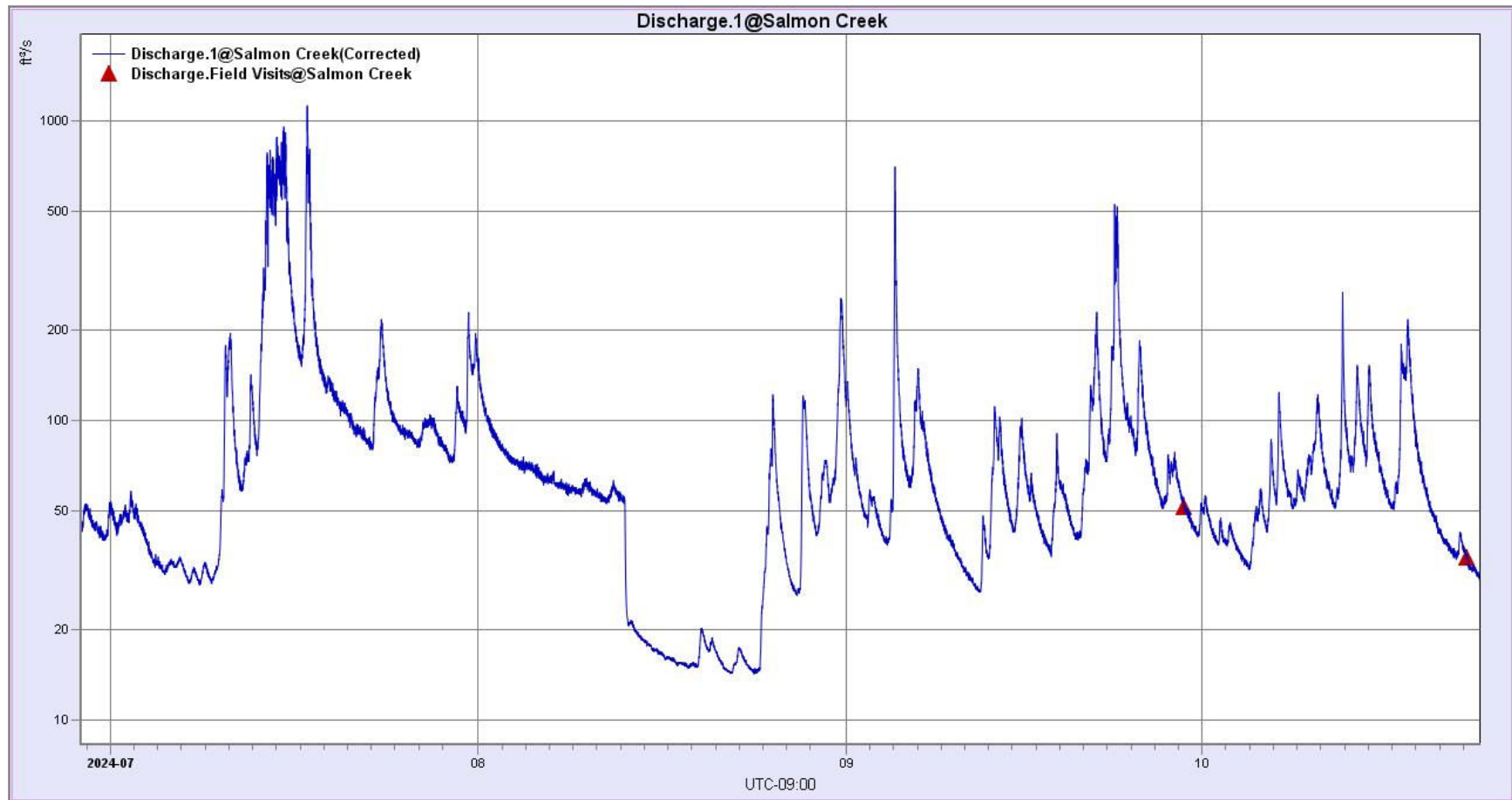


Figure C4 – Third Quarter 2024

APPENDIX D: SALMON CREEK STATION DESCRIPTION AND ANALYSIS

WATER YEAR 2024 (ALASKA HYDROSCIENCE)

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Salmon Creek Gaging Station near Juneau, Alaska

Station Description for the 2024 Water Year

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 (reported by the USGS), discharges are regulated.

ESTABLISHMENT AND HISTORY.—Gage established on April 27, 2016 at the same location and datum 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 is set and referenced to vertical datum established by the U.S. Geological Survey (see reference marks). Additional equipment is housed in a gage house on left bank.

CONTROL.—Low flow control is a boulder/cobble/gravel 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. The maximum gage height of 4.20 ft was also attained on Dec. 1-2, 2020 just prior to the transducer being damaged by the high-flow event.

WINTER FLOW.—The stage-discharge relationship will be periodically affected by ice during cold periods during 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. There is a supplemental water valve tapped off of the penstock at the base of the dam to supply additional water to Salmon Creek during periods of low flow. The valve discharges water directly into the natural channel. Operation of the valve is performed remotely by the AEL&P System Operator who also has real-time indication of the streamflow. When the flow drops to 9 ft³/s, an alarm is generated and the Operator opens the valve and logs the operation.

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 continues to reference these RMs to maintain accurate vertical datum. In a survey conducted on July 3, 2020 additional reference marks were added to the station to facilitate accurate tracking of station datum.

RM 1 – Brass cap anchored in concrete 2 feet shoreward of the orifice on left bank, elevation 2.64 feet. This RM is the base RM from which to begin level surveys.

RM2-- Established July 3, 2020. Head of rock bolt protruding from top of boulder 3 feet upstream from RM1, elevation 4.87 feet.

RM3—Established July 3, 2020. 3/8 in anchor bolt in on top of 5-foot boulder located approximately 15 feet upstream near the left edge of water, elevation 3.77 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 8.59 feet.

RM5.1-- Established July 3, 2020. Lag bolt on upstream side of 26-inch cottonwood tree on left bank 25 feet shoreward and 12 feet downstream of orifice, elevation 8.70 feet. Replacing RM5, which was nearly grown over by bark.

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 7.77 feet.

RM6.1- Established July 3, 2020. Lag bolt on same tree as RM6, elevation 8.02 feet. Used to replace RM6, which is nearly overgrown.

2024 WATER YEAR STATION ANALYSIS

GAGE HEIGHT RECORD.— Gage height record is complete for the 2024 water year with no periods of missing record. The gage height record was periodically subject to backwater due to ice during which times discharges were estimated. Gage height record was subject to backwater from ice on the following dates:

January 10-16; January 21-25; February 26- March 8, 2024.

GAGE HEIGHT CORRECTIONS.— Pressure transducers used to record stage are often subject to slight drift in recorded values. 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. Gage height corrections are typically prorated over time between site visits. Corrections less than +/- 0.02 feet are typically not applied unless they persist over multiple site visits. Gage height corrections for the 2024 water year ranged from no correction to +0.03 ft. A plot of corrected gage height and measured field values of gage height is shown below in figures 1 and 2.

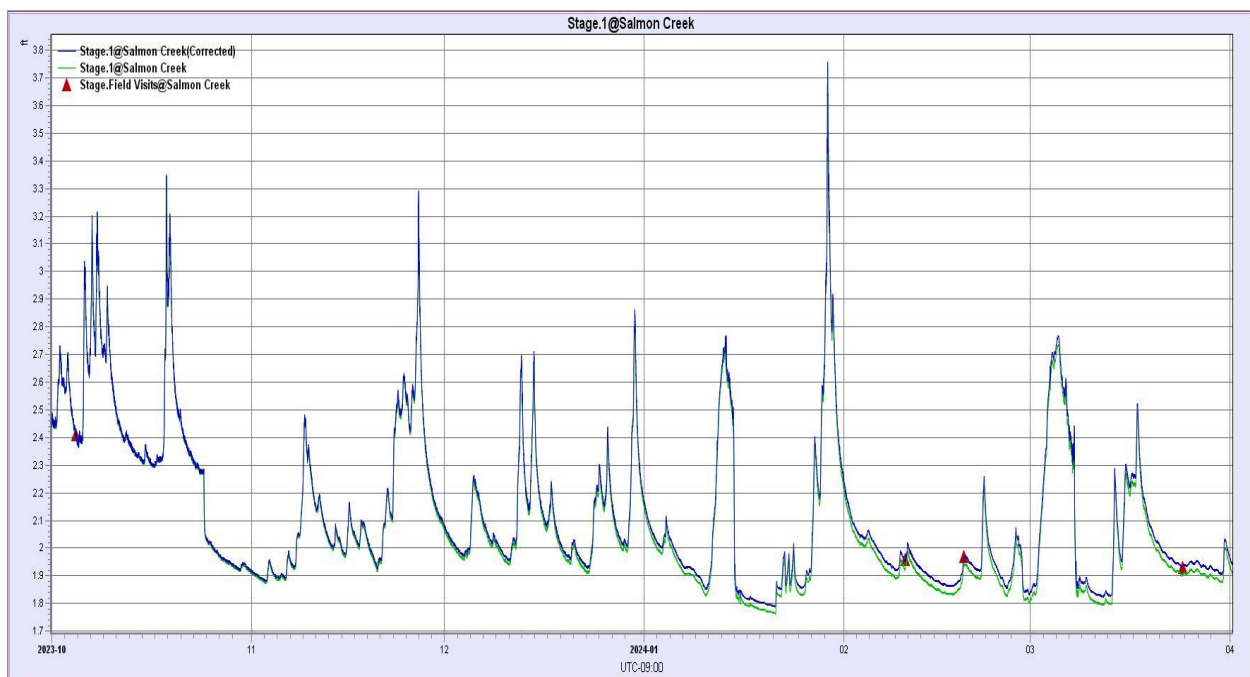


Figure 1. Stage data from Salmon Creek gaging station showing raw and corrected values and field readings from the outside reference gage (Oct. 2023 to April 2024).

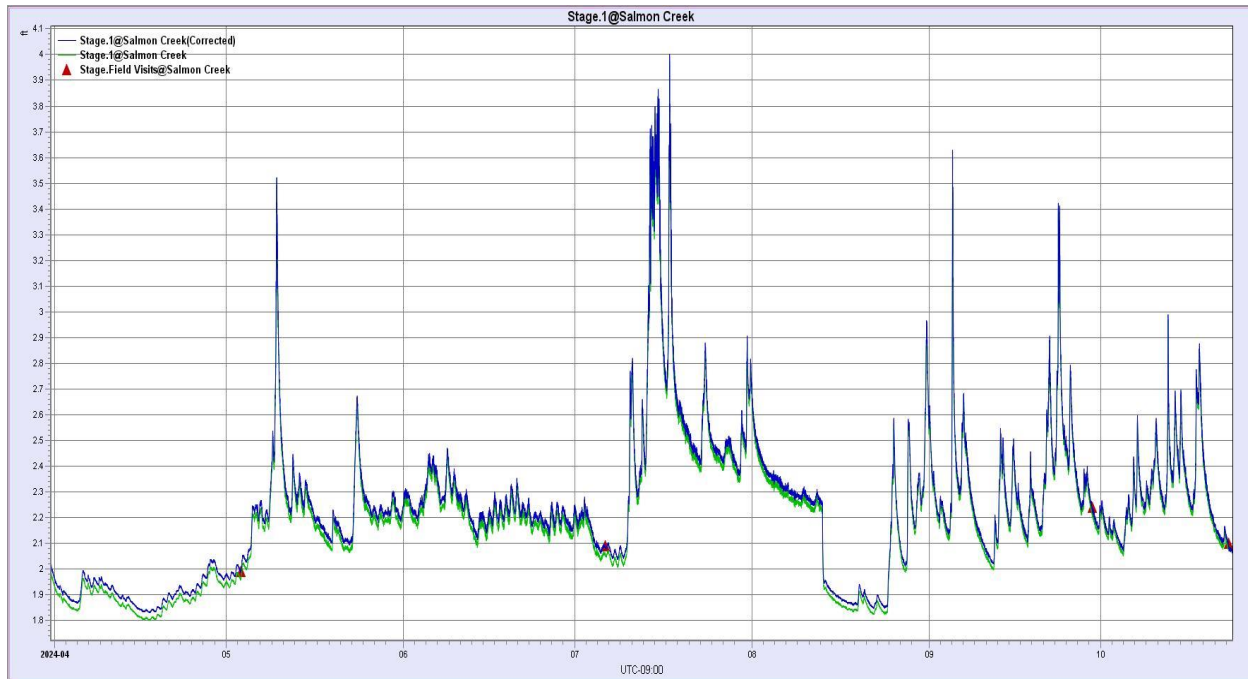


Figure 2. Stage data from Salmon Creek gaging station showing raw and corrected values and field readings from the outside reference gage (April 2024 to October 2024).

DATUM CORRECTIONS.— A complete level survey was conducted on July 3, 2020, and a partial level survey was conducted on November 19, 2022 and again on Oct. 24, 2024. No datum corrections were needed.

RATING.— The gage reach is under section control at low to midrange discharges and channel control at greater discharges. The gage reach is subject to scour and fill during peak flows and during salmon spawning season when salmon spawn throughout the gage reach.

Rating 3 was put into use on December 1, 2020, following a large peak that resulted in damage to the gage orifice and transducer and fill conditions throughout the gage reach. Rating 3 was developed following this peak based on discharge measurements 34-40, and further verified by measurements 41-46. Rating 3 utilized historic peak discharge measurements taken by the U.S. Geological Survey to define the high end of the rating. Rating 3 delineates reduced discharge throughout the range of stage when compared to rating 2, resulting from channel aggradation in the gage reach.

Seven discharge measurements (numbers 55), ranging from 19.8-90 ft³/s, were conducted since the beginning of the 2024 water year. All measurements were used in rating analysis. Rating curve and rating equation points for rating number 3 are shown below:

Rating Curve

Rating #3

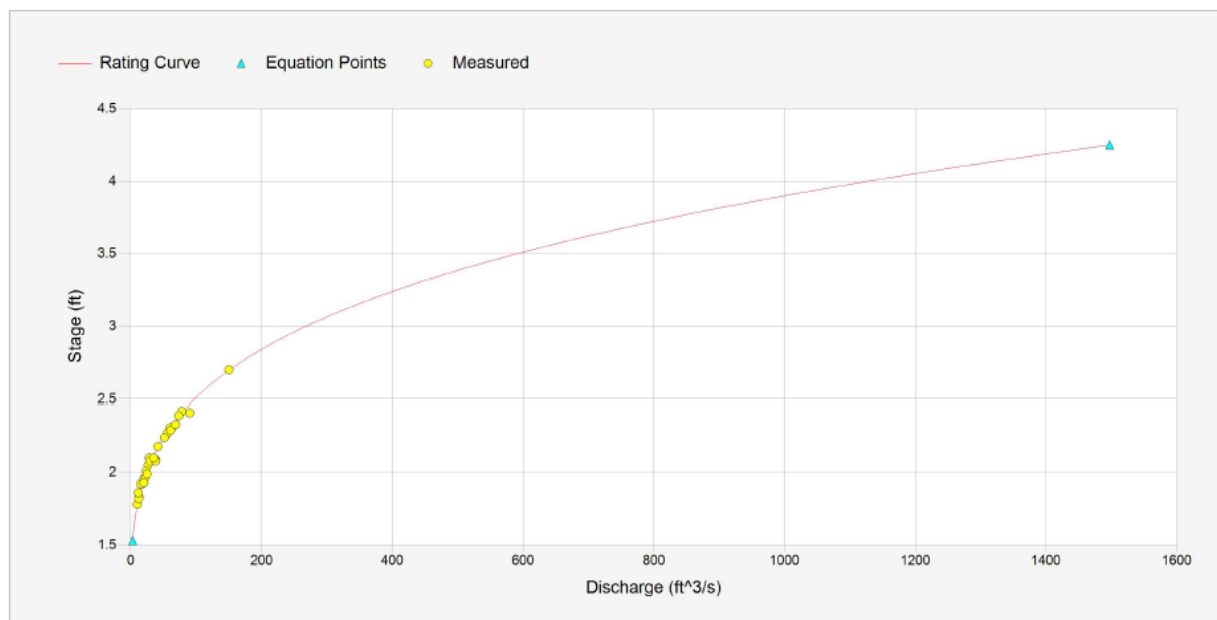
Label: Salmon Creek

Description: Site ID-Salmon Creek

Curve on: October 25, 2024

Curve Start Date: December 1, 2020

Location: Salmon Creek Juneau



Stage (ft)	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
1.00	0.00	0.00	0.00	0.00	0.00	0.00	3.93	6.70	10.67	16.10
2.00	23.28	32.52	44.15	58.50	75.95	96.86	121.64	150.67	184.40	223.25
3.00	267.67	318.12	375.10	439.07	510.55	590.05	678.10	775.24	882.03	999.01
4.00	1,126.78	1,265.92	1,417.02	1,497.25						

Figure 3. Salmon Creek Rating 3. Used for computing discharge for the 2024 water year, shown in graphic and tabular formats.

DISCHARGE RECORD.— Rating number three was used with two stage variable shift adjustments to compute discharge for the 2024 water year. Shifts adjustments were relatively small but consistent. Shift adjustments ranged from +0.02 to +0.06 ft. Stage variable shift 1 was used to adjust for slight

aggradation scour in the gage reach from Aug. 12, 2023 through Jan. 29, 2024. The shift adjustment was defined by measurements 53-55. Stage variable shifts 2 was used from Jan. 29, 2024 through the remainder of the water year. Stage variable shift 2 defines reduced scour through the gage reach and was defined by measurements 56-61. All shift adjustments to the rating were applied over discharge peaks.

Discharge record was affected by ice and discharges were estimated for numerous days from January through March (see **GAGE HEIGHT RECORD** for exact dates). Discharges were estimated from discharge measurements, examination of the stage record, and comparison with Juneau weather provided by the National Weather Service, and hydrologic records provided by the U.S. Geological Survey.

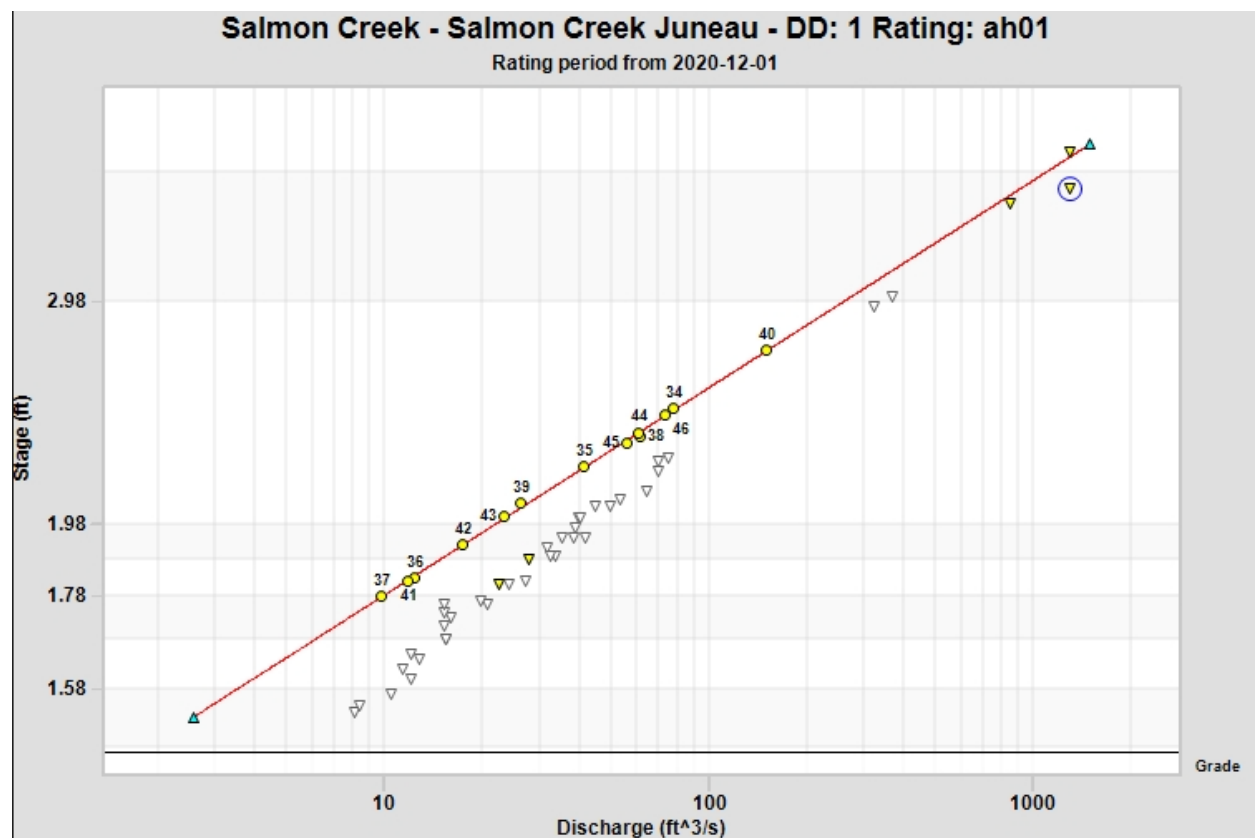


Figure 5. Salmon Creek rating number 3 (log scale) used to compute discharge from December 1, 2020, through the 2024 water year.

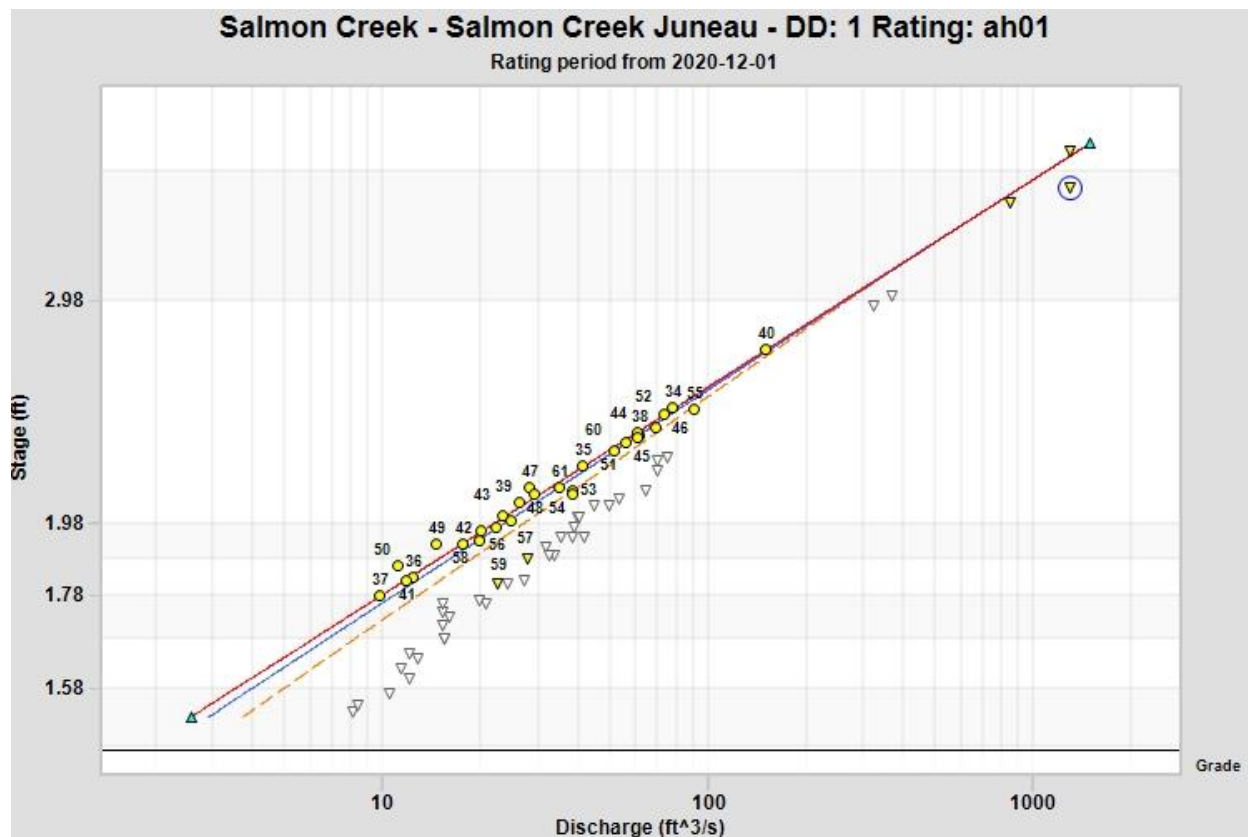


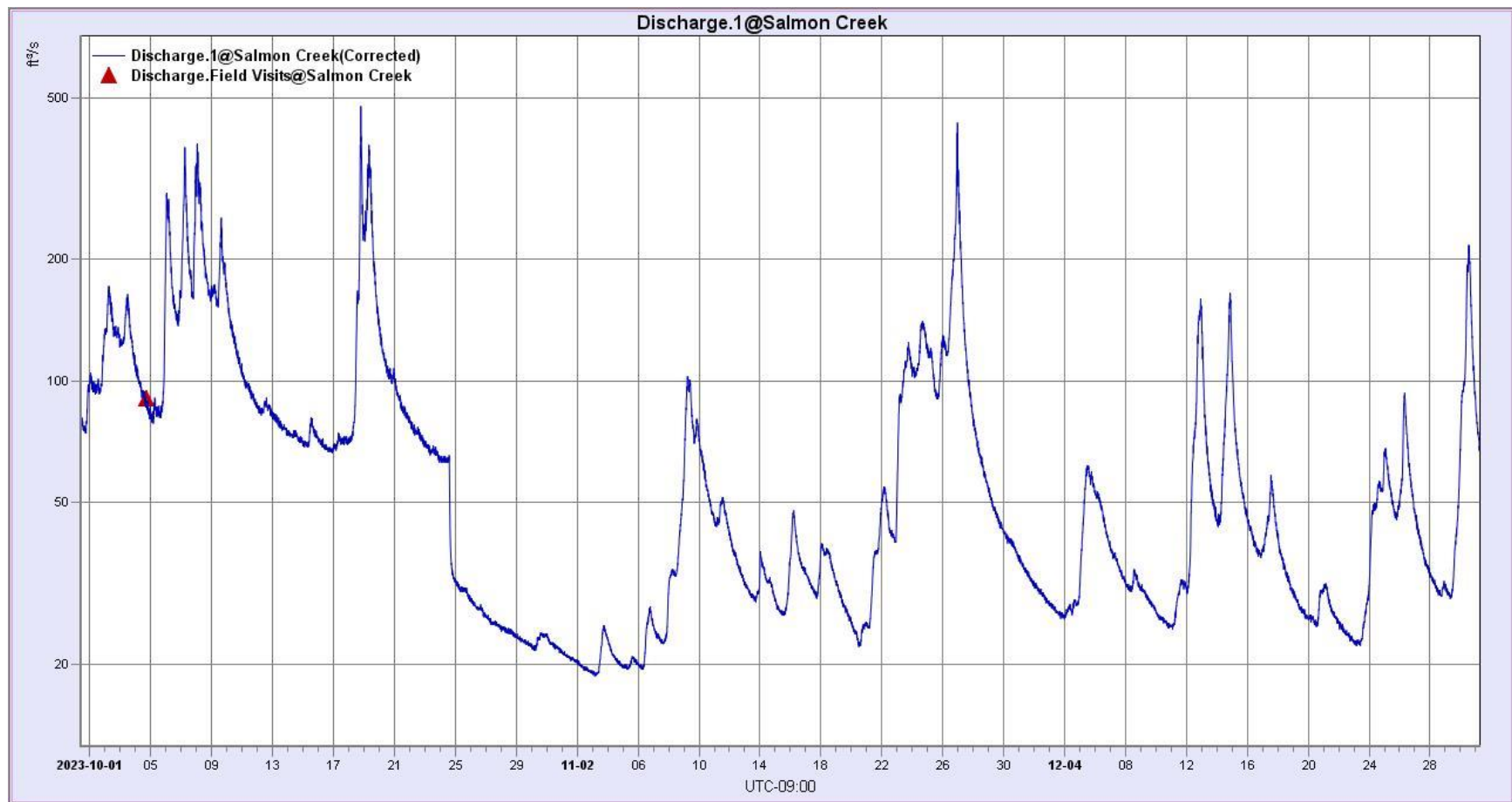
Figure 6. Salmon Creek shifted rating used to compute discharge during the 2024 water year.

REMARKS.— Discharge records are fair to good for discharges below 300 ft³/s and poor for higher discharges due to the relatively poor gage reach and lack of cross sections available to consistently make good discharge measurements. Discharges estimated due to backwater from ice are poor. Hydrographs and tabular discharge data for the 2024 are included in the following pages.

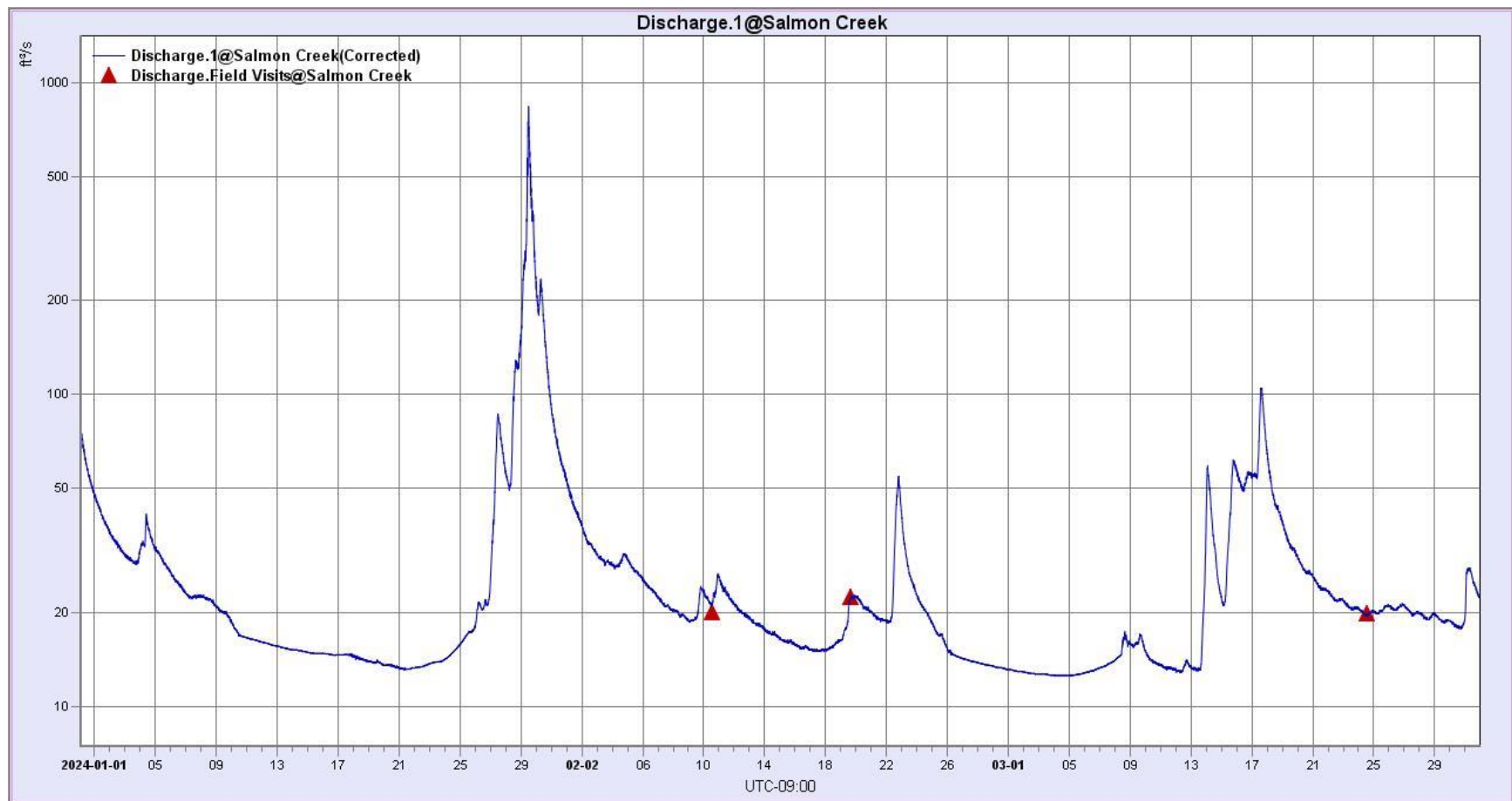
The following .csv files were included as attachments to this document:

Salmon Creek 15 min. 2024 Final.

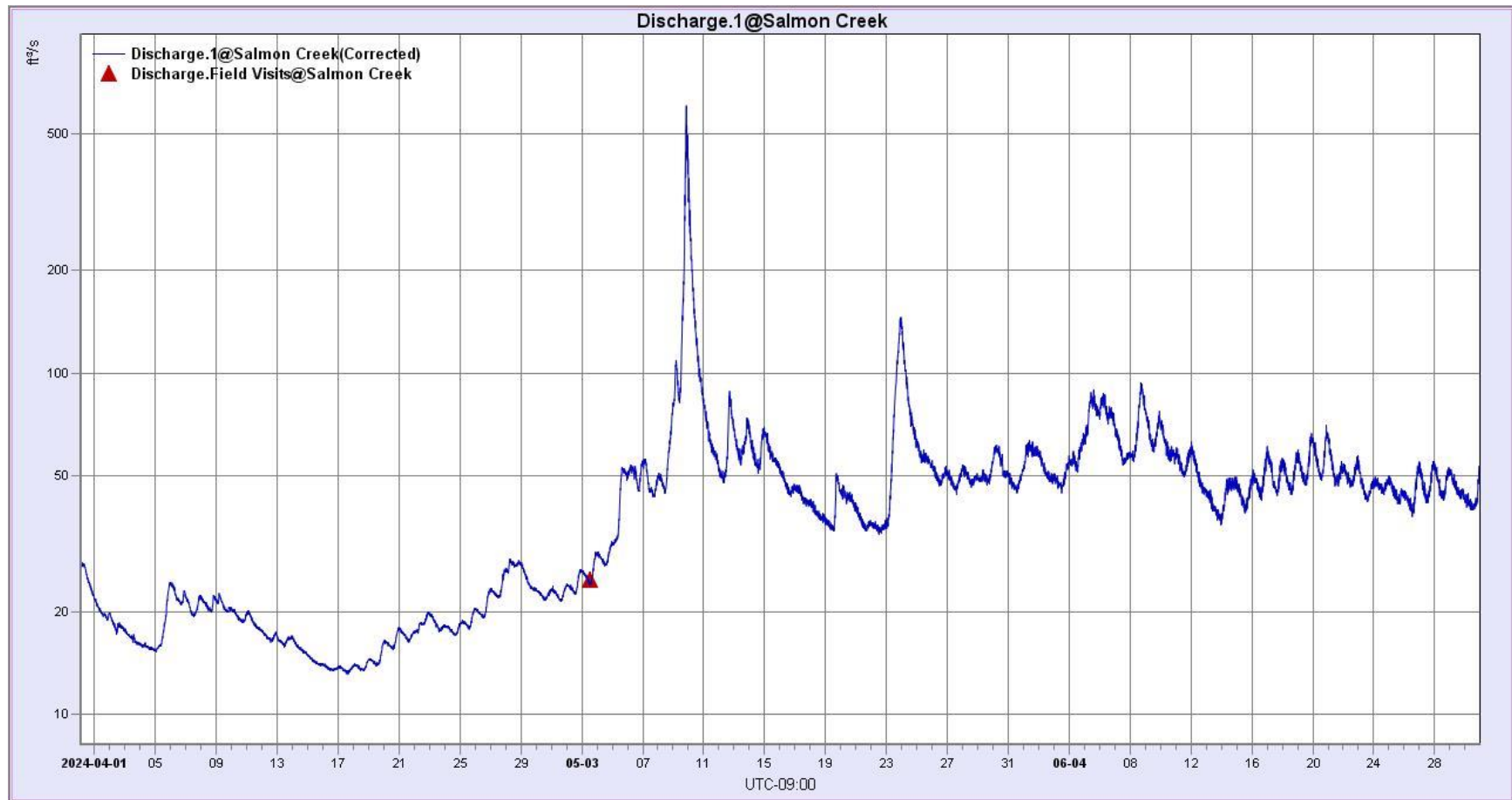
Salmon Creek Daily Mean 2024 WY Final.



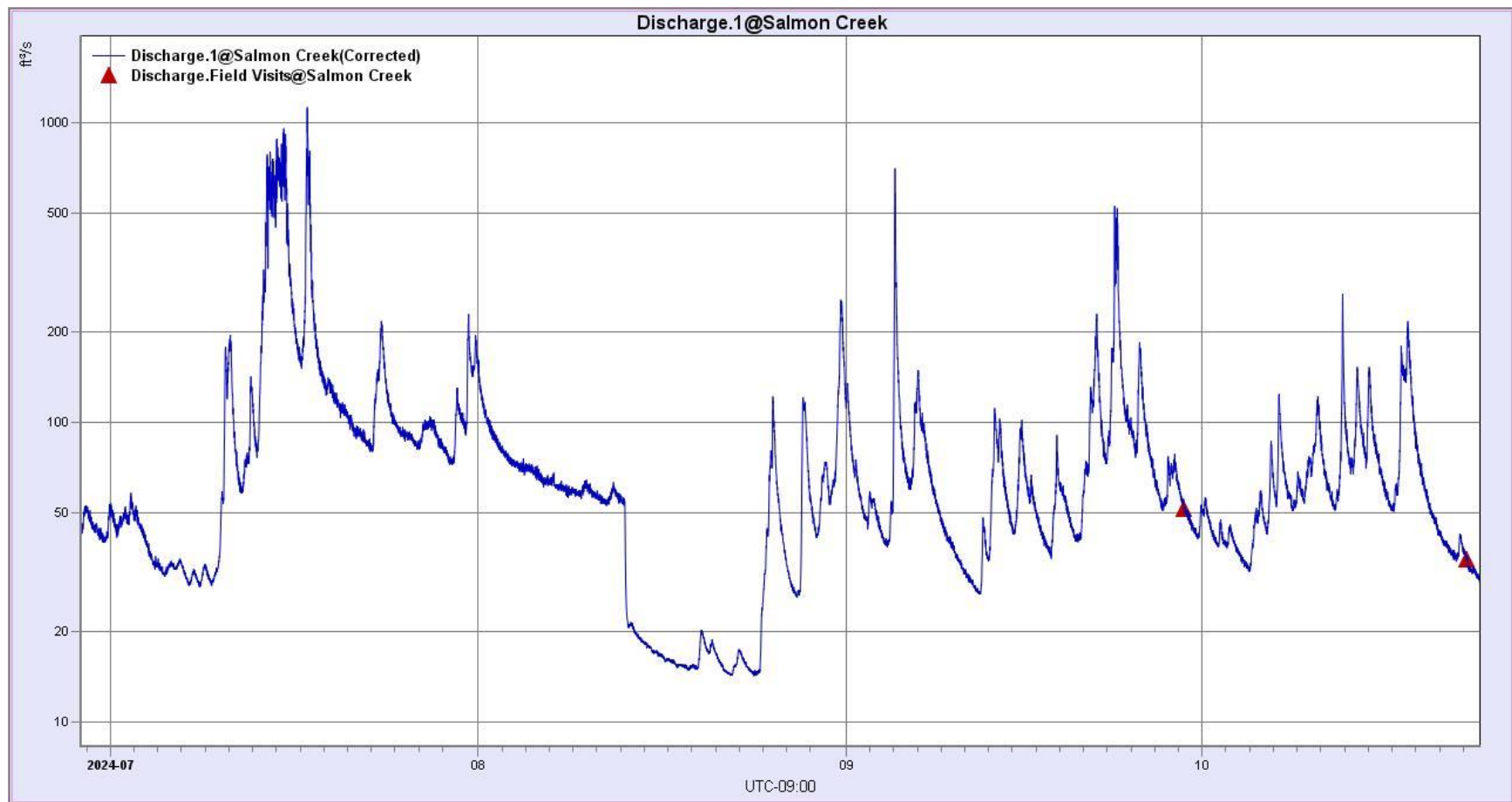
Computed discharge and field measurements for Salmon Creek near Juneau, Alaska from October 2023 to January 2024.



Computed discharge and field measurements for Salmon Creek near Juneau, Alaska from January to April 2024.



Computed discharge and field measurements for Salmon Creek near Juneau, Alaska from April to July 2024.



Computed discharge and field measurements for Salmon Creek near Juneau, Alaska from July to October 25, 2024.

Identifier: Discharge.1@Salmon Creek

Location: Salmon Creek Juneau

Units: ft³/s

Filter: None

Daily Mean Discharge 2024 WY - Salmon Creek

Year: 2024 Water Year

Aggr:

53

Min:

13

Max:

1100

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	100	21	34	41	44	13	20	23	59	47	120	88
2	140	20	30	33	34	13	18	24	52	50	88	52
3	130	21	27	30	29	13	17	26	49	45	76	50
4	93	21	28	35	29	13	16	29	57	36	71	44
5	94	20	52	29	27	13	18	42	77	32	69	160
6	190	23	47	25	24	13	22	51	78	33	65	78
7	230	24	35	23	21	14	21	48	60	31	62	98
8	230	38	32	22	20	15	21	55	71	31	60	57
9	180	82	29	20	20	16	21	190	68	31	59	42
10	130	56	26	17	23	14	19	160	61	84	59	35
11	95	46	29	16	23	13	19	64	55	110	55	30
12	85	36	80	16	20	13	17	62	51	82	57	34
13	78	30	68	15	18	16	16	62	41	140	35	74
14	73	33	85	15	17	37	16	59	45	570	19	60
15	73	28	64	15	16	39	14	58	44	680	18	65
16	69	39	40	15	15	53	14	47	49	230	17	60
17	71	32	46	15	15	72	14	44	51	410	16	43
18	160	36	34	14	16	48	14	39	50	180	15	52
19	230	28	28	14	20	34	15	40	54	130	17	54
20	110	24	27	13	21	28	16	43	57	110	18	44
21	88	34	28	13	19	24	17	37	53	96	16	97
22	74	46	24	13	32	22	18	35	51	87	15	120
23	67	100	25	14	28	21	18	79	46	140	16	220
24	53	120	50	15	20	20	18	87	47	120	16	130
25	30	110	54	17	17	20	19	57	45	93	61	110
26	28	180	64	21	15	21	20	50	44	87	49	86
27	25	150	39	60	14	20	23	48	48	94	29	57
28	24	65	31	91	14	19	27	50	48	92	73	68
29	23	47	38	370	13	19	25	50	46	77	48	53
30	23	40	130	160		18	22	55	43	100	64	45
31	22		61	67		25		48		160	150	
Aggr	97	51	45	41	22	23	19	57	53	140	49	73
Min	21	19	22	13	13	13	13	22	36	28	14	27
Max	470	430	220	840	55	110	28	610	93	1100	250	710

APPENDIX E: AGENCY COMMENTS

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Bryan Farrell

From: Larquier, Ann M (DFG) <ann.larquier@alaska.gov>
Sent: Tuesday, November 26, 2024 3:16 PM
To: Bryan Farrell
Cc: Cooper, Douglass; Sowa, Jarrod J (DFG); Mahara, Carol J; julianne.rosset; Klein, Joseph P (DFG)
Subject: Re: ** EXTERNAL ** RE: [EXTERNAL] Re: AELP WY24 Salmon Creek streamflow DRAFT report for comment

Hello Brian,

The Alaska Department of Fish and Game has reviewed the WY24 DRAFT Salmon Creek Streamflow Report and has no comments.

Please note, Leah Ellis' last day with ADF&G was November 4th. I am now responsible for hydropower coordination activities for Fish and Game with the assistance of Jarrod Sowa.

Thank you,

Ann Marie Larquier
Instream Flow Program
Alaska Department of Fish & Game

907-267-2311
ann.larquier@alaska.gov

From: Bryan Farrell <Bryan.Farrell@aelp.com>
Sent: Tuesday, November 26, 2024 11:04 AM
To: Mahara, Carol J <carol_mahara@fws.gov>; julianne.rosset <julianne.rosset@noaa.gov>
Cc: Cooper, Douglass <douglass_cooper@fws.gov>; Sowa, Jarrod J (DFG) <jarrod.sowa@alaska.gov>; Larquier, Ann M (DFG) <ann.larquier@alaska.gov>
Subject: RE: ** EXTERNAL ** RE: [EXTERNAL] Re: AELP WY24 Salmon Creek streamflow DRAFT report for comment

Some people who received this message don't often get email from bryan.farrell@aelp.com. [Learn why this is important](#)

CAUTION: This email originated from outside the State of Alaska mail system. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thank you.

Bryan

From: Mahara, Carol J <carol_mahara@fws.gov>
Sent: Tuesday, November 26, 2024 9:54 AM
To: julianne.rosset <julianne.rosset@noaa.gov>; Bryan Farrell <Bryan.Farrell@aelp.com>

Cc: Cooper, Douglass <douglass_cooper@fws.gov>; Sowa, Jarrod J (DFG) <jarrod.sowa@alaska.gov>; Larquier, Ann M (DFG) <ann.larquier@alaska.gov>

Subject: ** EXTERNAL ** RE: [EXTERNAL] Re: AELP WY24 Salmon Creek streamflow DRAFT report for comment

Hi Bryan,

Similarly, the U.S. Fish and Wildlife Service has no comments regarding the Draft Salmon Creek Stream Flow Monitoring Report for water year 2024.

Thanks,
Carol

Carol Mahara
Fish and Wildlife Biologist
Ecological Services
US Fish and Wildlife Service
4700 BLM Road
Anchorage, AK 99507
carol_mahara@fws.gov
Cell: 907-280-9751

From: Julianne Rosset - NOAA Federal <julianne.rosset@noaa.gov>

Sent: Tuesday, November 26, 2024 9:41 AM

To: Bryan Farrell <Bryan.Farrell@aelp.com>

Cc: Cooper, Douglass <douglass_cooper@fws.gov>; Sowa, Jarrod J (DFG) <jarrod.sowa@alaska.gov>; Mahara, Carol J <carol_mahara@fws.gov>; Larquier, Ann M (DFG) <ann.larquier@alaska.gov>

Subject: [EXTERNAL] Re: AELP WY24 Salmon Creek streamflow DRAFT report for comment

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hi Bryan,

The National Marine Fisheries Service is in receipt of the WY24 Draft Salmon Creek (FERC No. 2307) Streamflow Report, which was emailed to us on October 25, 2024. At this time, we have no comments.

Thank you!

Kind regards,
Julianne

Julianne Rosset (she/her)
Hydropower Program Coordinator | Alaska Region
NOAA Fisheries | U.S. Department of Commerce
Office: 907-271-3654 ***please note this is a new number***
[Alaska Region Hydropower Projects](#)



On Mon, Nov 25, 2024 at 3:18 PM Bryan Farrell <Bryan.Farrell@aelp.com> wrote:

Hi all,

This is a reminder that any comments on the draft streamflow report are due tomorrow. If you don't have any comments, please reply to this email to indicate that.

Thanks and happy holidays!

Bryan

From: Bryan Farrell

Sent: Friday, October 25, 2024 4:31 PM

To: douglass_cooper@fws.gov; benjamin.johnson@noaa.gov; Ellis, Leah M (DFG) <leah.ellis@alaska.gov>; evangeline.houston@noaa.gov; barb.lake@noaa.gov

Subject: AELP WY24 Salmon Creek streamflow DRAFT report for comment

Hello,

The WY24 DRAFT Salmon Creek Streamflow Report is attached for your review. Please respond with any comments, or "no comment", by November 26th.

Thank you for taking the time to look it over.

Bryan Farrell, PE

VP, Power Generation

Alaska Electric Light & Power Company | 5601 Tongard Court, Juneau, AK 99801

907.759.5939 direct | 907.209.3701 mobile

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