

DIVISION OF MINING, LAND AND WATER
WATER RESOURCES SECTION
www.dnr.state.ak.us/mlw/water/index.htm



Anchorage Office 550 West 7 th Avenue, Suite 1020 Anchorage, AK 99501-3562 (907) 269-8588 Fax: (907) 269-8947		For ADNR Use Only Date/Time Stamp
For ADNR Use Only LAS #	For ADNR Use Only CID #	For ADNR Use Only Receipt Type WR

APPLICATION FOR RESERVATION OF WATER

INSTRUCTIONS <ol style="list-style-type: none"> 1. Complete one application per stream segment or water body (incomplete applications will not be accepted). 2. Attach legible map(s) indicating all sections from the beginning to the end of stream segment or for all parts of the lake or water body. 3. Submit non-refundable fee of \$1,500. 4. Attach extra pages for each section, as needed.
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APPLICANT INFORMATION			
_____ Organization Name (if applicable)		_____ Agent or Consultant Name (if applicable)	
_____ Individual Applicant Name (if applicable)		_____ Individual Co-applicant Name (if applicable)	
_____ Mailing Address	_____ City	_____ State	_____ Zip Code
_____ Daytime Phone Number		_____ Alternate Phone Number (optional)	
_____ Fax Number (optional)		_____ E-Mail Address (optional)	

LOCATION OF PROPOSED RESERVATION OF WATER					
Geographic Name of Waterbody _____					
Meridian	Township	Range	Section	Quarter Sections	
				1/4	1/4
				1/4	1/4

Describe the location of the point or points defining the boundary of the proposed reservation of water by river mile index, river mile, geographical or cultural landmark, etc., on the stream or water body.

Attach a US Geological Survey map at 1:63,360 scale, or 1:250,000 scale if 1:63,360 scale is unavailable for the area, clearly identifying the following for the proposed reservation of water:

1. Sections, townships, range and meridians
2. The stream or water body in which the reservation of water is proposed
3. Specific point or points defining the boundary of the proposed reservation of water
4. Permanent, temporary or planned locations of water measurement devices (such as gaging stations, weirs, staff gages)
5. Permanent, temporary or planned bench marks

WATER USE

Identify the purpose(s) of the proposed reservation of water by checking the appropriate box(es).

- Protection of fish and wildlife habitat, migration, and propagation
- Recreation and park purposes
- Navigation and transportation purposes
- Sanitary and water quality purposes

Describe in detail the purpose(s) of the proposed reservation, including, when appropriate, species and life stage, type of recreation, vehicle, or water quality parameter, or other relevant information.

Is the water currently being used for the purpose(s) applied for?

Yes

No If no, when will use for this purpose begin? Specify approximate date _____

WATER QUANTITY

Water requested to be reserved – **Check one**

- To maintain a specific instream flow rate, measured in cubic feet per second
- To maintain a specific amount of surface water, measured in cubic feet or acre feet
- To maintain a specific surface water elevation, measured in relation to a permanent benchmark

Quantify the specific amount of water requested to be reserved. Identify and quantify, as appropriate, flow rates, quantities, surface water elevations, depths, etc., as they relate to the requested time periods of the year during which the reservation is proposed. Include any flow release schedules from projects upstream of the proposed reservation that would be necessary.

METHODOLOGY AND MONITORING

Attach and submit with this application documentation or reports showing facts to support the following:

- (a) The need for the proposed reservation of water, including reasons why the reservation is being requested.
- (b) Identify and describe the methodology, data, and data analysis used to substantiate the need for and the quantity of water requested for the proposed reservation of water, including:
 - 1. Name and description of method used
 - 2. Who conducted the study and analysis
 - 3. Schedule of when data collection and analysis occurred
 - 4. Type(s) of instrument(s) used to collect and analyze data
 - 5. Description of data and how the data were collected, including when applicable, (A) selection of stream reach, study site and transect selection, (B) flow, survey, elevation, and depth measurements, (C) pertinent physical, biological, water chemistry and socio-economic data
 - 6. Description of how data were analyzed, and
 - 7. Maps, photos, aerial photos, calculations, and any other documents supporting this application

If there are provisions for monitoring this proposed reservation of water, include the following:

- (a) Description of monitoring equipment (such as gaging stations, staff gages, weirs)
- (b) Location of monitoring equipment
- (c) Provisions for payment for monitoring
- (d) Reporting system

11 AAC 93.142 sets out the required information on the application for a reservation of water. 11 AAC 93.143 authorizes the commissioner to decide what additional information needed to process an application for a reservation of water. This information is made a part of the state public water records and becomes public information under AS 40.25.110 and 40.25.120. Public information is open to inspection by you or any member of the public. A person who is the subject of the information may challenge its accuracy or completeness under AS 44.99.310, by giving a written description of the challenged information, the changes needed to correct it, and a name and address where the person can be reached. False statements made in an application for a benefit are punishable under AS 11.56.210.

SIGNATURE

The information presented in this application is true and correct to the best of my knowledge.

Signature

Date

Name (please print)

Title (if applicable)

Fee required by regulation 11 AAC 05.010(a)(8)

- **\$1,500** for up to 40 hours of staff time

Make checks payable to "Department of Natural Resources."

LOCATION OF PROPOSED RESERVATION OF WATER

Meridian	Township	Range	Sections
Copper River	73S	82E	19 and 20

Threemile Creek is a tributary to Klawock Lake near the town of Klawock on Prince of Wales Island in Southeast Alaska (Figure 1). This proposed reservation of water applies to stream flows within Reach A, one of four reaches within the Threemile Creek watershed for which ADF&G has submitted a reservation of water application. Reach A begins at the downstream end of Threemile Creek at Klawock Lake and extends upstream to the Hollis Highway Bridge at river mile 0.65 (Figure 2). Stream reach boundaries were selected to ensure fish were present and to minimize the differences in flows (from accretion or reduction) within the reach. Reach boundaries were based on U.S. Geological Survey (U.S. Geological Survey, 1962) topographic maps.

Threemile Creek flows in a southwesterly direction before entering the northeast side of Klawock Lake (Figure 2). The surface elevation of Klawock Lake is 9.1 m, a total surface area of 11.9 km², a mean depth of 17.7 m, and a maximum depth of 49 m (Conitz 2010). The landscape surrounding Threemile Creek and Klawock Lake is primarily influenced by a maritime climate with an average Jan temp of 39°F and average July temp of 55°F and an average annual precipitation of 88 inches.

WATER USE

The primary purpose of this proposed reservation is to protect fish habitat, migration and propagation within Threemile Creek and its watershed. This reach has been specified as important to anadromous fish (under AS 16.05.871) as Anadromous Water Catalog stream number 103-60-10470-2071 by the Alaska Department of Fish and Game (Johnson and Blanche 2011). Coho salmon (*Oncorhynchus kisutch*), pink salmon (*O. gorbuscha*), sockeye salmon (*O. nerka*), cutthroat trout (*O. clarki*), and Dolly Varden (*Salvelinus malma*) utilize Threemile Creek for a portion of, or all of their spawning, incubation, rearing, and passage life phases (S. McCurdy, Sport Fish Biologist, ADF&G, Craig, 2006, personal communication; Figure 3). These species contribute to sport and commercial (K. Monagle Commercial Fisheries Biologist, ADF&G, Douglas, 2003, personal communication) fisheries in the area and provide recreational opportunities and values as well. Water of sufficient quantity is needed to sustain production of these valuable fisheries.

WATER QUANTITY

Requested instantaneous flows in cubic feet per second (cfs) to be reserved:

Time Period	Requested Reservation Flows (cfs)
January	56
February	31
March	27

April	40
May	73
June	78
July	58
August	52
September	94
October	81
November	73
December	60

METHODOLOGY AND MONITORING

Procedures used to prepare this reservation complied with reservation of water application instructions and requirements established by state law (AS 46.15.145) and regulations (11 AAC 93.141-147), and relevant portions of the *"State of Alaska Instream Flow Handbook"* (DNR 1985).

Requested flows were based primarily on flow duration analyses (Annear et al. 2004). Flow requests were developed with seasonal flow variability that mimicked the natural hydrograph. This approach provided a basis to mimic natural seasonal flows to which fish and other aquatic fauna have adapted to and are dependent upon (Hynes 1970; Estes 1984; Estes and Orsborn 1986; Poff et al. 1997; Richter et al. 1997; Stewardson and Gippel 2003; Annear et al. 2004; Lytle and Poff 2004; Arthington et al. 2006).

Hydrologic Analyses:

The United States Geological Survey (USGS) operated stream gage 15081610 within Reach B (latitude 55° 32' 06", longitude 132° 57' 17") from March 1, 1999 to September 30, 2003 (Figure 2). ADF&G operated stream gage 11001 at the same location from October 1, 2005 to October 18, 2006. Instantaneous and mean daily flow data from stream gage 15081610 were obtained from the USGS National Water Information System website (<http://waterdata.usgs.gov/nwis>).

USGS and ADF&G took measurements of instantaneous discharge near the upstream boundary of Reach A (latitude 55° 31' 54" longitude 132° 59' 05") at USGS discharge station 15081611 and ADF&G discharge station 11002 (Figure 2). Measurements of instantaneous discharge were taken 14 times at these stations from September 13, 2000 to May 5, 2006 (Table 1). Instantaneous flow data from discharge station 15081611 were obtained from the USGS National Water Information System website (<http://waterdata.usgs.gov/nwis>).

The 14 instantaneous discharge measurements taken at USGS discharge station 15081611 and ADF&G discharge station 11002 were regressed against 14 instantaneous discharge measurements taken at USGS stream gage station 15081610 and ADF&G stream gage station 11001 for the corresponding time period (Table 1, Figure 4). The estimated regression parameter

was used to predict mean daily flows within Reach A from March 01, 1999 to September 30, 2003 and October 01, 2005 to October 18, 2006 (mean daily flows period of record from USGS stream gage 15081610 and ADF&G stream gage 11001). SAS-based applications¹ were then used to generate mean daily, monthly, and annual flow summaries and flow duration values by specified time period.

Flow Duration Analyses:

Duration estimates represent the expected frequency of occurrence of mean daily flows within the specified time periods. The durations of daily mean flows were calculated as the percentiles of the empirical distribution of observed values within the specified time periods over the period of record (Table 2). This provided an estimate of the percentage of time a given mean daily flow was equaled or exceeded within the distribution of mean daily flows for each time period analyzed.

Mean Flow Statistics:

Mean monthly flows were estimated as the mean of monthly mean daily flows for all complete months over the entire period of record (Figure 6 and Table 3). Mean annual flows were estimated as a mean of the annual mean daily flow values for all complete water years of record (Table 4). Mean daily flows are presented in Figure 5 and Table 5.

Reservation of Water:

Sufficient flows are needed to support riverine habitats used by fish and to provide fluvial processes that maintain these habitats. To maintain seasonal uses of habitats by each life history stage, we recommend maintaining a flow regime that mimics the magnitude and timing of the natural flow regime as discussed above. This approach is necessary to meet the needs of species' life history stages that have coevolved and exhibit biological adaptations to the river's flow regime.

In general, flow requests fell within the 25 to 75% exceedance range for the specified time periods. Flows within the 25 to 75% exceedance range are normal hydrologic conditions and should provide flows and habitat conditions to which fish have adapted. Deviations from these levels subject riverine species to conditions that are increasingly uncommon. Flows outside of this range are defined as dry (75 to 100% exceedance) or wet (0 to 25% exceedance) conditions according to the USGS (2009).

Although important for maintaining fish habitat and overall aquatic and riparian productivity, channel maintenance or other high flows were not specified and requested within this application. Channel maintenance flows are gradually ascending and descending and most effectively meet sediment transport thresholds for the full-range of particle sizes. Evidence suggests that bankfull flow approximates the effective discharge in stable stream channels

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(Andrews 1980; Leopold 1994; Annear et al. 2004). Other types of periodic high flows are recognized for their importance to habitat maintenance and support of other environmental and biological needs, such as fish migration cues. Collectively, these flows provide the function and structure of river ecosystems (Annear et al. 2004; Schmidt and Potyondy 2004).

Currently, there is no monitoring of streamflow in Threemile Creek.

REFERENCES

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U.S. Geological Survey. 2009. <http://waterwatch.usgs.gov/ptile.html>.

Figure 1. Area map, Threemile Creek near Klawock, Prince of Wales Island, Southeast Alaska.

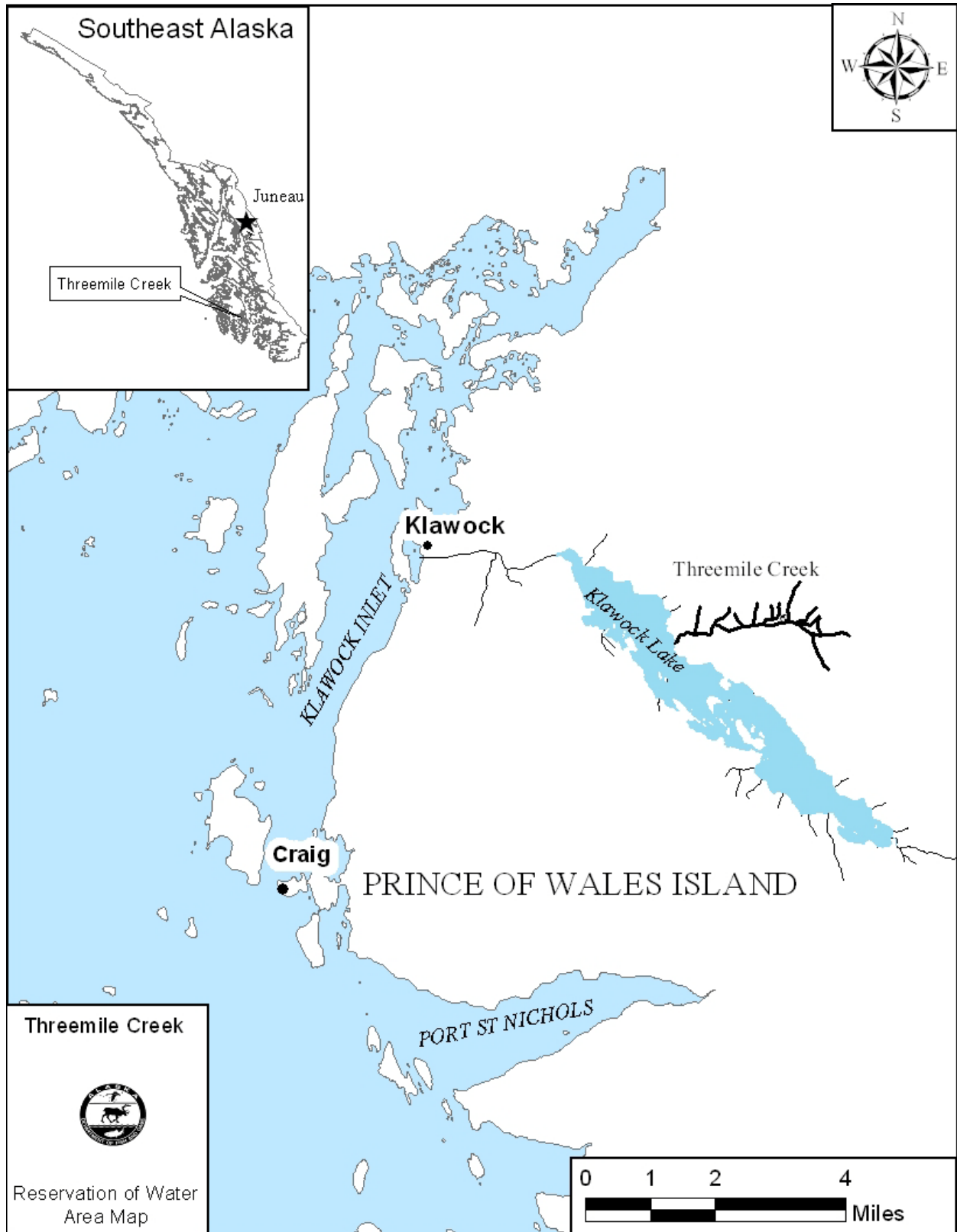


Figure 2. Reservation of Water reach boundaries, Threemile Creek near Klawock, Prince of Wales Island, Southeast Alaska.

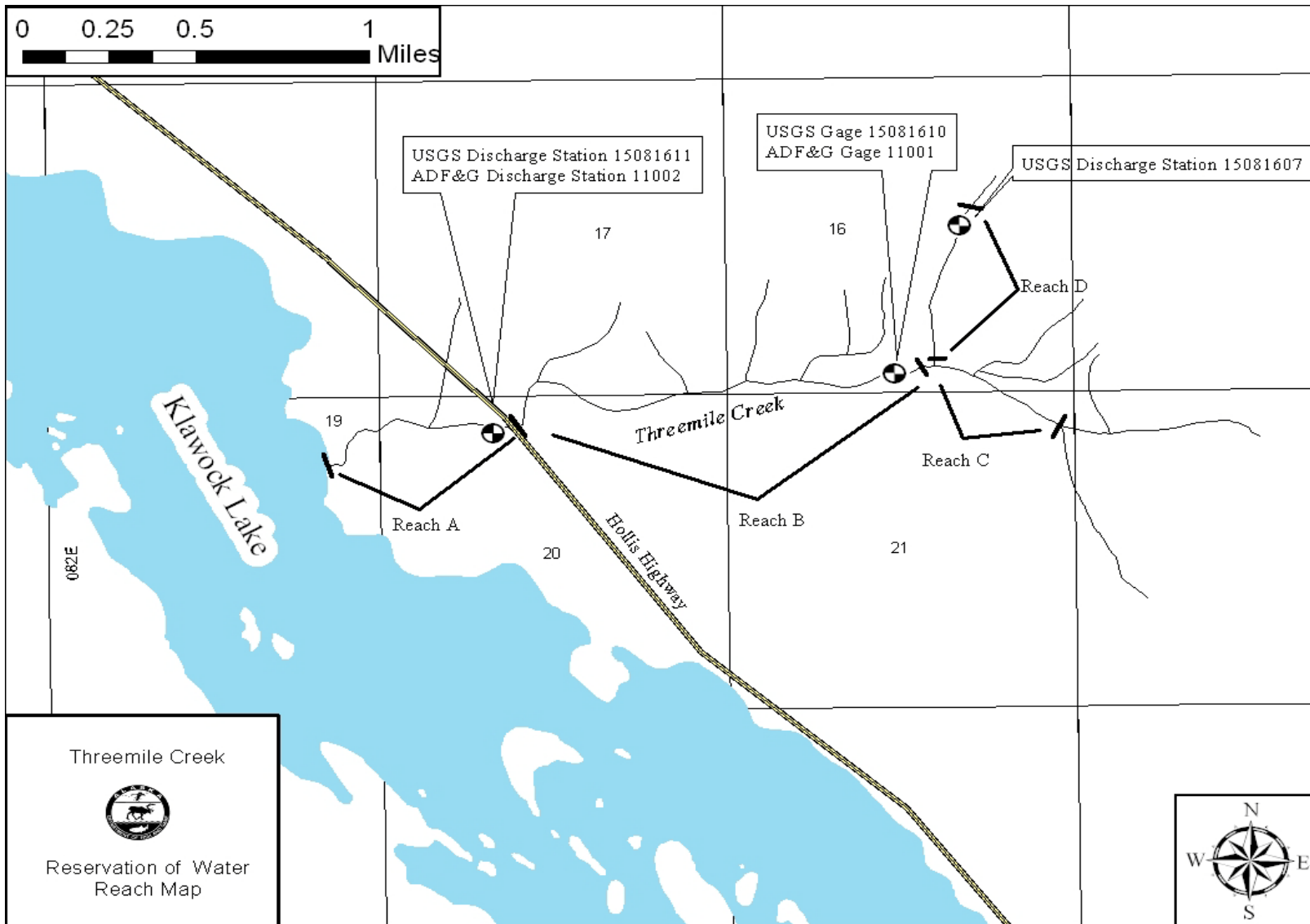


Figure 3. Fish species periodicity chart for Threemile Creek near Klawock, Prince of Wales Island, Southeast Alaska.

Coho Salmon

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XX	XXXX	XXXX	XX						
Adult Passage								XXXX	XXXX	XXXX	XX	
Spawning								XX	XXXX	XXXX	XXXX	XX
Incubation	XXXX	XXXX	XXXX	XXXX				XX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Pink Salmon

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fry Passage			XX	XXXX	XXXX	XX						
Adult Passage							XXXX	XXXX	XXXX			
Spawning							XX	XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XXXX	XX		XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing				XXXX	XX							

Sockeye Salmon

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fry Passage				XXXX	XXXX	XX						
Adult Passage						XX	XXXX	XXXX				
Spawning							XXXX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Dolly Varden

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt passage *			XXXX	XXXX	XXXX							
Adult passage			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Spawning									XX	XXXX	XX	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				XX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Cutthroat Trout

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt passage *			XXXX	XXXX	XXXX							
Adult passage			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Spawning				XXX	XXXX	XX						
Incubation				XXX	XXXX	XXXX	XXXX	XX				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists

Smolt passage is for juvenile emigration to estuarine/marine environment

Adult passage: for salmon is immigration: for trout, char, and other species, immigration and emigration.

Incubation life phase includes time of egg deposition to fry emergence

* DV and CT smolt defined as those fish undergoing initial emigration

Figure 4. Simple linear regression relationship between instantaneous discharge (cfs) measured at USGS discharge station 15081611 and ADF&G discharge station 11002 and instantaneous discharge (cfs) measured at USGS stream gage 15081610 and ADF&G stream gage 11001 taken over the corresponding time period.

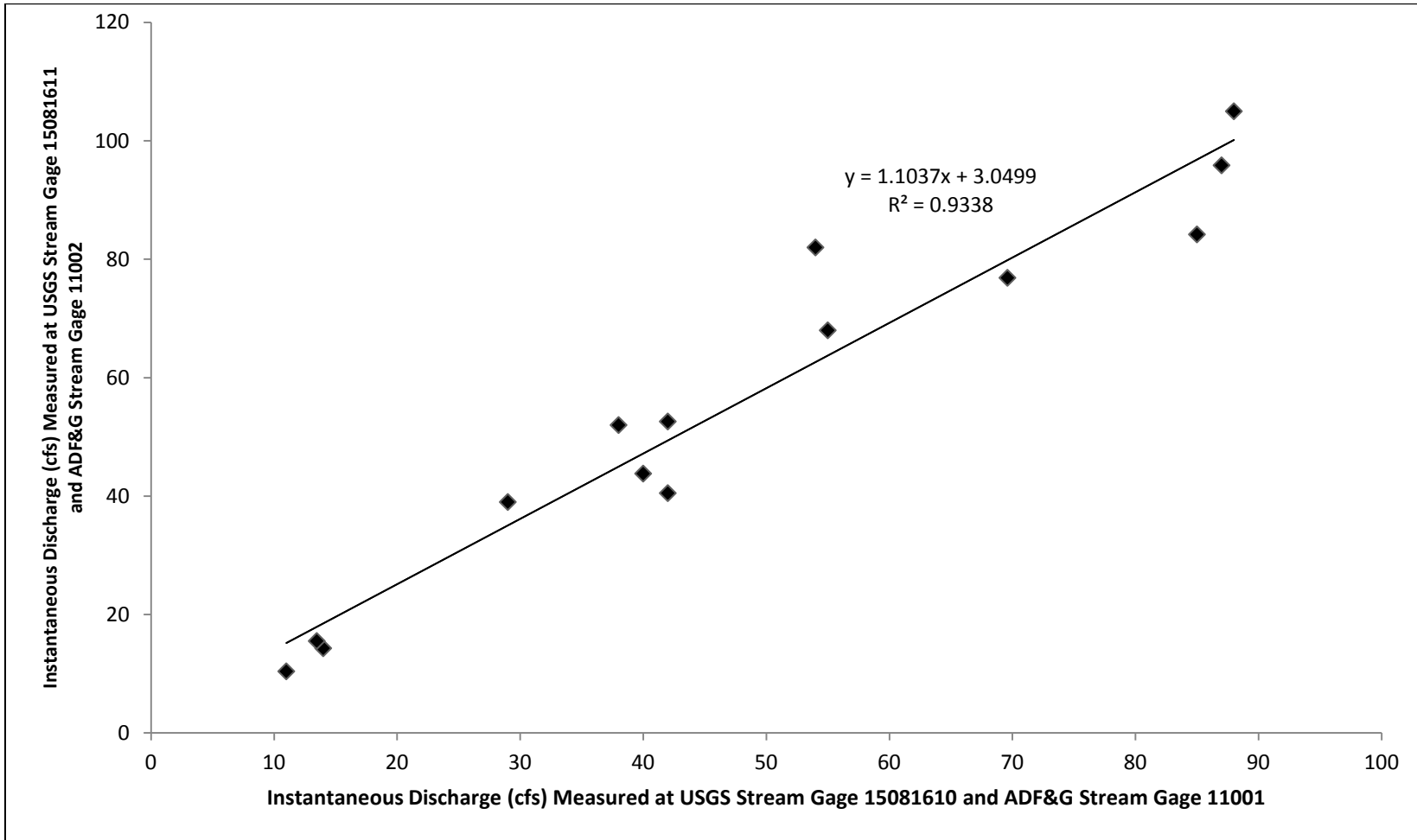


Figure 5. Annual hydrograph of estimated mean daily flows (cfs) for Threemile Creek Reservation Reach A. Based on complete water years of record from USGS gage 15081610 (October 1, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

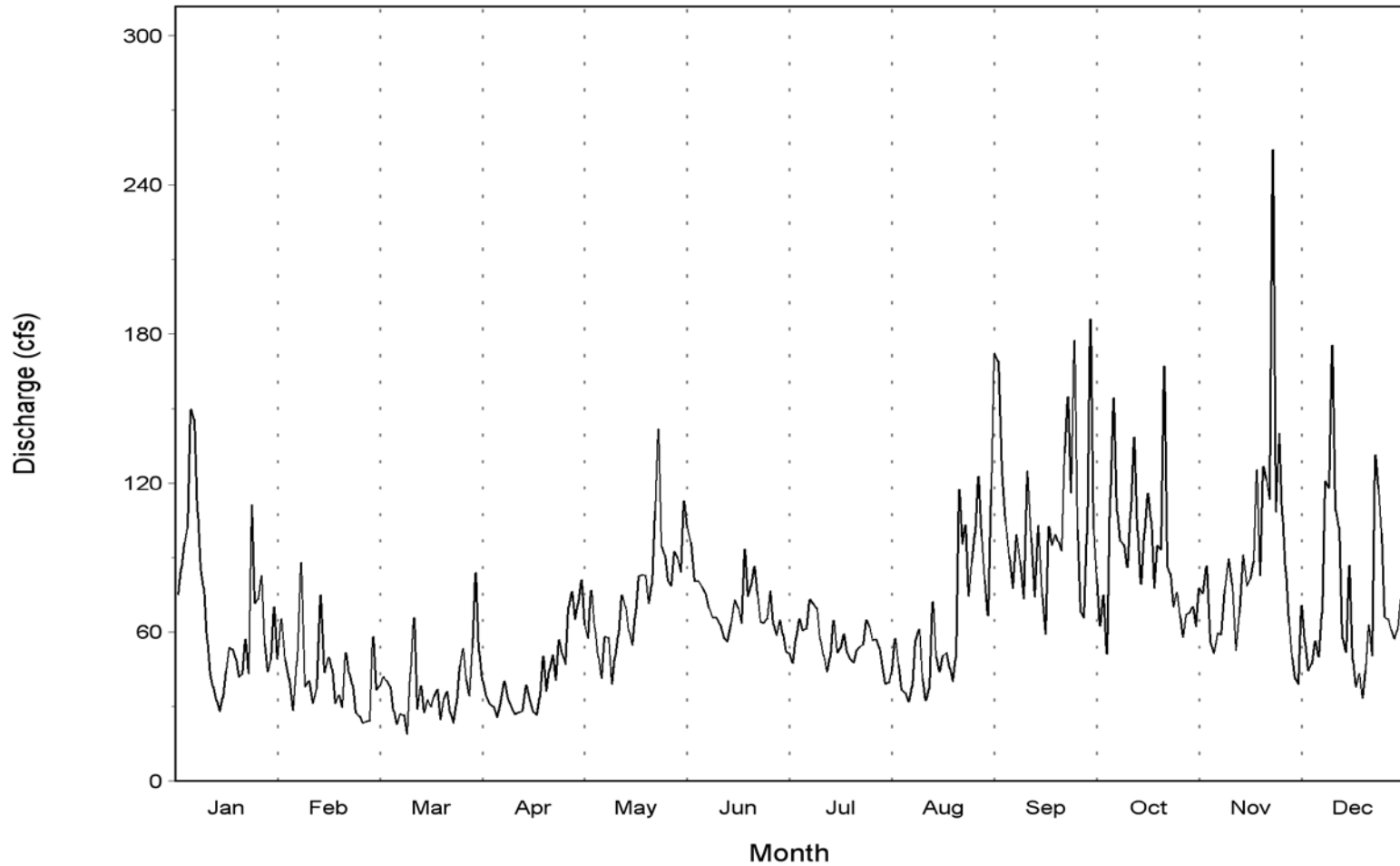


Figure 6. Estimated mean monthly flows and reservation flow requests (cfs) for Threemile Creek Reservation Reach A. Based on complete months of record from USGS gage 15081610 (March 01, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

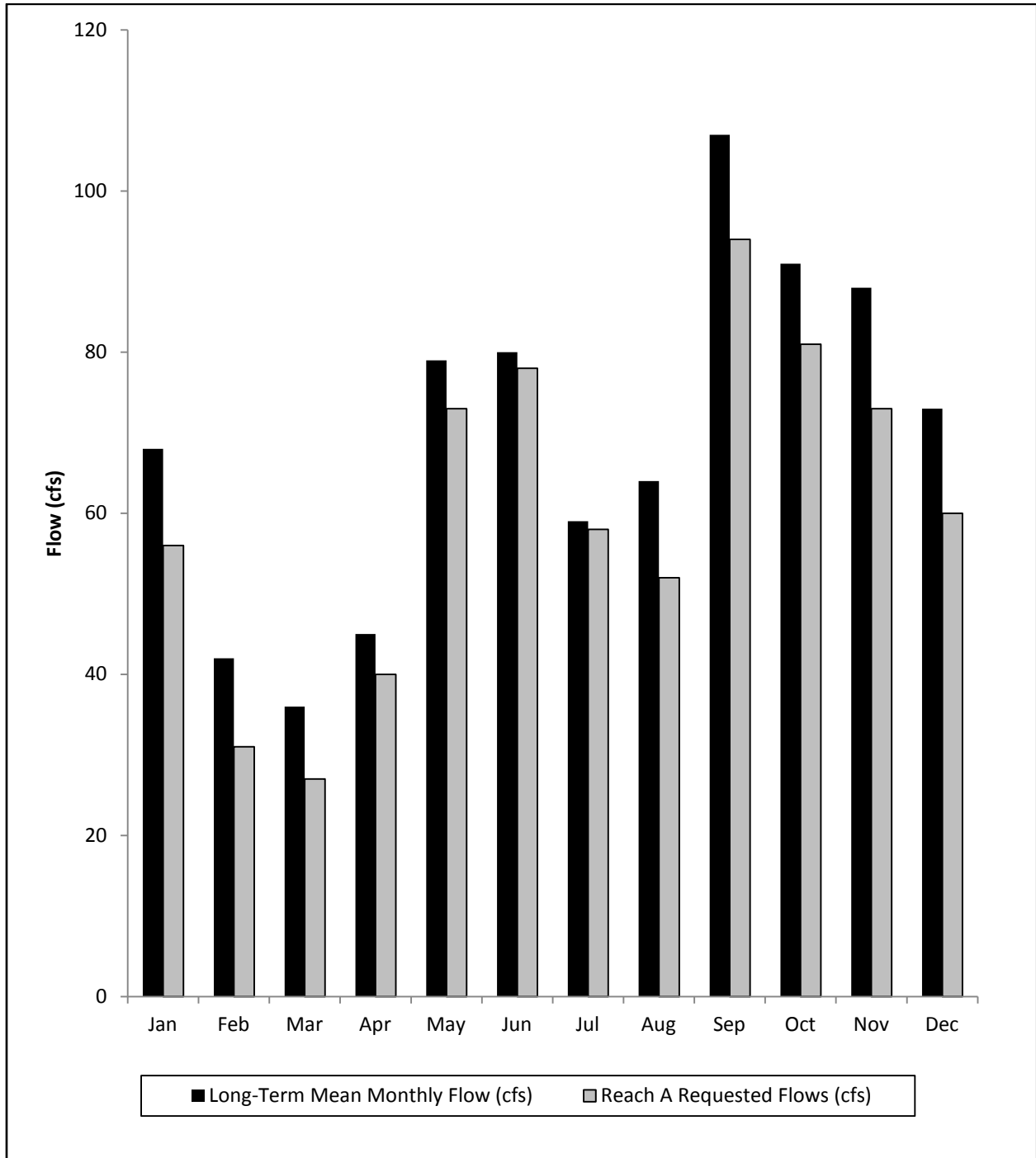


Table 1. USGS discharge station 15081611 and ADF&G discharge station 11002 instantaneous discharge measurement data and instantaneous discharge measured at USGS stream gage 15081610 and ADF&G stream gage 11001 for the corresponding time period.

Date	USGS 15081611 & ADF&G 11002 Instantaneous Discharge (cfs)	USGS 15081610 & ADF&G 11001 Instantaneous Discharge (cfs)
09/13/2000	53	42
12/07/2000	82	54
04/22/2001	39	29
07/10/2001	84	85
08/29/2001	52	38
10/30/2001	105	88
02/07/2002	14	14
04/03/2002	10	11
06/20/2002	41	42
04/01/2003	44	40
10/19/2005	68	55
10/26/2005	77	70
02/28/2006	16	13
05/05/2006	96	87

Table 2. Estimated monthly exceedance flows (cfs) for Threemile Creek Reservation Reach A. Based on complete months of record from USGS gage 15081610 (March 01, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

% Time exceeded	January	February	March	April	May	June	July	August	September	October	November	December
0	388	307	268	159	496	185	170	303	473	535	857	587
5	174	104	87	101	159	152	110	179	241	172	209	205
10	136	78	67	83	127	118	98	125	202	148	153	141
15	104	67	57	72	116	115	88	100	183	132	125	107
20	90	55	49	64	103	106	83	89	164	122	106	92
25	80	49	44	56	94	101	74	80	144	108	97	81
30	76	42	38	52	88	96	70	74	128	99	88	76
35	69	37	34	47	81	89	64	66	111	90	80	72
40	60	33	31	43	77	83	59	57	100	84	77	65
45	56	31	27	40	73	78	58	52	94	81	73	60
50	52	28	26	37	70	74	54	49	85	74	70	56
55	46	26	23	34	65	69	52	44	80	69	68	48
60	44	24	21	32	62	66	49	42	69	66	62	43
65	41	23	20	29	57	63	47	37	65	63	57	40
70	35	23	18	27	51	59	44	35	62	57	53	34
75	32	22	17	26	46	54	40	33	58	54	48	31
80	28	21	16	24	44	49	34	30	49	53	43	29
85	25	20	15	23	40	46	32	22	43	47	37	26
90	21	19	13	21	33	40	28	17	33	40	33	24
95	17	17	12	16	31	35	23	14	27	32	24	22
100	15	14	11	14	23	30	17	13	19	24	22	20
Mean	68	42	36	45	79	80	59	64	107	91	88	73

Table 3. Estimated mean monthly flow statistics (cfs) for Threemile Creek Reservation Reach A. Based on complete months of record from USGS gage 15081610 (March 01, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

Month	# of Months	Minimum monthly flow (cfs)	Mean monthly flow (cfs)	Maximum monthly flow (cfs)
January	5	43	68	92
February	5	33	42	56
March	6	21	36	55
April	6	31	45	58
May	6	61	79	101
June	6	50	80	122
July	6	41	59	78
August	6	41	64	103
September	6	67	107	133
October	5	69	91	127
November	5	67	88	152
December	5	56	73	96

Table 4. Estimated mean annual flows (cfs) for Threemile Creek Reservation Reach A. Based on complete water years of record from USGS gage 15081610 (October 1, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

Water year	Number of days of record	QAA (cfs)
2000	366	65
2001	365	66
2002	365	68
2003	365	66
2006	365	74
Mean for period of record	1,826	68

Table 5. Estimated mean daily flow statistics (cfs) for Threemile Creek Reservation Reach A. Based on complete water years of record from USGS gage 15081610 (October 1, 1999 to September 30, 2003) and ADFGgage 11001 (October 01, 2005 to September 30, 2006).

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
1	January 1	5	51	75	138
2	January 2	5	38	86	175
3	January 3	5	36	96	174
4	January 4	5	31	102	274
5	January 5	5	53	150	338
6	January 6	5	88	145	262
7	January 7	5	46	108	154
8	January 8	5	75	85	99
9	January 9	5	52	78	124
10	January 10	5	41	57	92
11	January 11	5	35	43	72
12	January 12	5	28	38	67
13	January 13	5	25	32	51
14	January 14	5	21	28	42
15	January 15	5	20	34	57
16	January 16	5	19	44	76
17	January 17	5	17	54	83
18	January 18	5	17	53	76
19	January 19	5	17	49	78
20	January 20	5	16	42	68
21	January 21	5	16	43	70
22	January 22	5	15	57	130
23	January 23	5	15	43	85
24	January 24	5	15	111	388
25	January 25	5	16	72	187
26	January 26	5	19	73	224
27	January 27	5	21	83	136
28	January 28	5	20	55	99
29	January 29	5	20	44	78
30	January 30	5	22	49	80
31	January 31	5	22	70	157

-continued-

Table 5.--Page 2 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
32	February 1	5	20	49	97
33	February 2	5	30	65	100
34	February 3	5	25	49	80
35	February 4	5	24	41	70
36	February 5	5	22	29	41
37	February 6	5	23	48	136
38	February 7	5	20	88	307
39	February 8	5	19	38	67
40	February 9	5	22	40	77
41	February 10	5	21	31	52
42	February 11	5	21	37	62
43	February 12	5	20	75	207
44	February 13	5	19	44	78
45	February 14	5	19	50	128
46	February 15	5	17	45	128
47	February 16	5	17	31	69
48	February 17	5	17	35	68
49	February 18	5	17	30	51
50	February 19	5	17	52	109
51	February 20	5	16	43	73
52	February 21	5	16	38	78
53	February 22	5	16	27	40
54	February 23	5	15	26	48
55	February 24	5	14	23	42
56	February 25	5	14	24	35
57	February 26	5	20	24	33
58	February 27	5	20	58	184
59	February 28 OR 29	6	16	37	67

-continued-

Table 5.--Page 3 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
60	March 1	5	18	38	59
61	March 2	5	17	42	64
62	March 3	5	17	40	62
63	March 4	5	17	38	92
64	March 5	5	17	28	64
65	March 6	5	16	23	34
66	March 7	5	14	27	55
67	March 8	5	12	27	55
68	March 9	5	11	19	27
69	March 10	5	11	44	153
70	March 11	5	12	66	268
71	March 12	5	14	29	83
72	March 13	5	14	38	91
73	March 14	5	14	28	43
74	March 15	5	13	33	63
75	March 16	5	13	30	43
76	March 17	5	13	34	68
77	March 18	5	12	37	87
78	March 19	5	12	25	45
79	March 20	5	12	33	68
80	March 21	5	12	36	67
81	March 22	5	12	27	51
82	March 23	5	12	24	35
83	March 24	5	13	31	49
84	March 25	5	25	46	88
85	March 26	5	21	53	118
86	March 27	5	23	41	77
87	March 28	5	21	35	56
88	March 29	5	20	54	145
89	March 30	5	18	84	233
90	March 31	5	17	52	95

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Table 5.-Page 4 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
91	April 1	5	15	41	90
92	April 2	5	15	34	74
93	April 3	5	15	31	63
94	April 4	5	15	30	44
95	April 5	5	14	26	37
96	April 6	5	15	32	54
97	April 7	5	15	40	57
98	April 8	5	15	33	48
99	April 9	5	15	30	49
100	April 10	5	23	27	35
101	April 11	5	20	28	39
102	April 12	5	24	28	32
103	April 13	5	21	39	61
104	April 14	5	21	32	48
105	April 15	5	19	28	37
106	April 16	5	19	27	37
107	April 17	5	16	34	55
108	April 18	5	19	50	92
109	April 19	5	21	36	47
110	April 20	5	33	45	73
111	April 21	5	32	51	74
112	April 22	5	32	41	47
113	April 23	5	34	57	144
114	April 24	5	26	51	102
115	April 25	5	24	47	67
116	April 26	5	26	70	159
117	April 27	5	30	76	157
118	April 28	5	40	65	106
119	April 29	5	54	72	99
120	April 30	5	52	81	112

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Table 5.–Page 5 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
121	May 1	5	46	63	80
122	May 2	5	40	58	76
123	May 3	5	34	77	153
124	May 4	5	31	62	93
125	May 5	5	26	50	85
126	May 6	5	25	42	69
127	May 7	5	23	58	98
128	May 8	5	23	58	119
129	May 9	5	25	39	51
130	May 10	5	28	50	74
131	May 11	5	30	59	78
132	May 12	5	44	75	127
133	May 13	5	36	70	120
134	May 14	5	33	60	88
135	May 15	5	36	55	74
136	May 16	5	46	67	106
137	May 17	5	36	82	116
138	May 18	5	33	83	116
139	May 19	5	31	83	117
140	May 20	5	30	72	121
141	May 21	5	44	79	122
142	May 22	5	84	109	160
143	May 23	5	83	142	304
144	May 24	5	62	94	139
145	May 25	5	53	91	133
146	May 26	5	52	81	112
147	May 27	5	54	79	106
148	May 28	5	73	92	141
149	May 29	5	70	90	159
150	May 30	5	45	84	128
151	May 31	5	62	113	213

-continued-

ATTACHMENT A. THREEMILE CREEK REACH A RESERVATION OF WATER APPLICATION.
 Page 21

Table 5.--Page 6 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
152	June 1	5	54	102	155
153	June 2	5	46	96	129
154	June 3	5	41	80	101
155	June 4	5	37	81	117
156	June 5	5	35	78	104
157	June 6	5	34	76	111
158	June 7	5	32	69	116
159	June 8	5	32	66	118
160	June 9	5	31	66	116
161	June 10	5	31	63	97
162	June 11	5	30	58	70
163	June 12	5	30	56	69
164	June 13	5	30	63	89
165	June 14	5	31	73	115
166	June 15	5	41	70	108
167	June 16	5	41	64	89
168	June 17	5	55	93	185
169	June 18	5	47	74	116
170	June 19	5	40	79	112
171	June 20	5	35	86	150
172	June 21	5	47	75	130
173	June 22	5	43	64	99
174	June 23	5	38	64	96
175	June 24	5	36	66	92
176	June 25	5	40	76	102
177	June 26	5	44	63	74
178	June 27	5	44	59	66
179	June 28	5	37	65	83
180	June 29	5	40	59	68
181	June 30	5	37	52	67

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Table 5.--Page 7 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
182	July 1	5	37	51	70
183	July 2	5	34	48	59
184	July 3	5	30	58	99
185	July 4	5	27	65	113
186	July 5	5	25	61	94
187	July 6	5	25	62	116
188	July 7	5	30	73	170
189	July 8	5	40	71	130
190	July 9	5	36	70	127
191	July 10	5	34	57	96
192	July 11	5	33	51	72
193	July 12	5	32	44	59
194	July 13	5	32	50	78
195	July 14	5	31	65	150
196	July 15	5	31	52	91
197	July 16	5	29	54	83
198	July 17	5	25	59	86
199	July 18	5	23	52	68
200	July 19	5	21	49	94
201	July 20	5	22	48	88
202	July 21	5	28	53	72
203	July 22	5	29	54	74
204	July 23	5	33	55	78
205	July 24	5	33	65	125
206	July 25	5	23	62	98
207	July 26	5	21	57	105
208	July 27	5	20	57	110
209	July 28	5	23	54	89
210	July 29	5	21	46	83
211	July 30	5	19	39	74
212	July 31	5	17	40	68

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Table 5.--Page 8 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
213	August 1	5	17	45	81
214	August 2	5	20	57	114
215	August 3	5	22	46	80
216	August 4	5	17	36	50
217	August 5	5	16	35	57
218	August 6	5	15	32	53
219	August 7	5	14	38	83
220	August 8	5	14	57	129
221	August 9	5	14	61	131
222	August 10	5	13	41	76
223	August 11	5	13	33	56
224	August 12	5	13	37	80
225	August 13	5	13	72	218
226	August 14	5	15	50	89
227	August 15	5	15	44	68
228	August 16	5	14	51	98
229	August 17	5	14	52	86
230	August 18	5	14	46	74
231	August 19	5	16	40	66
232	August 20	5	33	50	80
233	August 21	5	51	117	303
234	August 22	5	42	95	177
235	August 23	5	35	103	243
236	August 24	5	33	75	129
237	August 25	5	36	88	185
238	August 26	5	35	100	204
239	August 27	5	33	122	240
240	August 28	5	32	99	176
241	August 29	5	36	81	125
242	August 30	5	43	67	125
243	August 31	5	54	117	235

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Table 5.--Page 9 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
244	September 1	5	42	172	318
245	September 2	5	33	169	322
246	September 3	5	27	125	224
247	September 4	5	47	104	161
248	September 5	5	38	90	155
249	September 6	5	32	78	109
250	September 7	5	65	99	148
251	September 8	5	66	88	127
252	September 9	5	44	73	122
253	September 10	5	32	125	202
254	September 11	5	28	98	191
255	September 12	5	30	74	111
256	September 13	5	25	103	290
257	September 14	5	22	75	166
258	September 15	5	20	59	99
259	September 16	5	19	103	236
260	September 17	5	22	95	208
261	September 18	5	34	99	187
262	September 19	5	28	96	152
263	September 20	5	51	93	142
264	September 21	5	41	132	267
265	September 22	5	34	155	286
266	September 23	5	31	116	205
267	September 24	5	27	177	427
268	September 25	5	25	101	181
269	September 26	5	23	68	96
270	September 27	5	23	66	132
271	September 28	5	45	100	247
272	September 29	5	44	186	473
273	September 30	5	41	101	224

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Table 5.--Page 10 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
274	October 1	5	57	82	137
275	October 2	5	43	63	107
276	October 3	5	52	75	125
277	October 4	5	32	51	69
278	October 5	5	24	114	388
279	October 6	5	37	154	473
280	October 7	5	54	108	166
281	October 8	5	67	97	152
282	October 9	5	59	95	153
283	October 10	5	48	86	132
284	October 11	5	54	109	172
285	October 12	5	59	138	232
286	October 13	5	57	101	200
287	October 14	5	43	79	140
288	October 15	5	53	100	151
289	October 16	5	53	116	186
290	October 17	5	44	105	155
291	October 18	5	37	78	145
292	October 19	5	59	95	155
293	October 20	5	53	93	154
294	October 21	5	45	167	535
295	October 22	5	40	86	108
296	October 23	5	35	83	148
297	October 24	5	32	70	109
298	October 25	5	30	76	129
299	October 26	5	32	67	95
300	October 27	5	40	58	90
301	October 28	5	33	67	142
302	October 29	5	28	68	109
303	October 30	5	26	70	91
304	October 31	5	25	62	81

-continued-

Table 5.–Page 11 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
305	November 1	5	23	78	105
306	November 2	5	23	76	115
307	November 3	5	22	87	149
308	November 4	5	22	56	75
309	November 5	5	24	52	68
310	November 6	5	34	59	73
311	November 7	5	33	59	81
312	November 8	5	27	77	131
313	November 9	5	24	89	220
314	November 10	5	23	79	191
315	November 11	5	23	53	80
316	November 12	5	43	68	99
317	November 13	5	45	91	209
318	November 14	5	37	79	129
319	November 15	5	33	82	119
320	November 16	5	36	88	125
321	November 17	5	62	125	291
322	November 18	5	51	83	168
323	November 19	5	53	127	302
324	November 20	5	64	121	201
325	November 21	5	57	114	209
326	November 22	5	70	254	857
327	November 23	5	48	109	232
328	November 24	5	38	140	382
329	November 25	5	43	107	275
330	November 26	5	34	84	158
331	November 27	5	30	64	108
332	November 28	5	27	50	70
333	November 29	5	24	41	58
334	November 30	5	22	39	59

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ATTACHMENT A. THREEMILE CREEK REACH A RESERVATION OF WATER APPLICATION.

Page 27

Table 5.–Page 12 of 12.

Julian Day	Day of Year	# of days of record	Minimum-mean daily flow (cfs)	Mean-mean daily flow (cfs)	Maximum-mean daily flow (cfs)
335	December 1	5	20	71	194
336	December 2	5	20	56	149
337	December 3	5	21	45	77
338	December 4	5	22	47	73
339	December 5	5	22	56	136
340	December 6	5	24	50	110
341	December 7	5	35	68	127
342	December 8	5	44	121	331
343	December 9	5	40	118	265
344	December 10	5	34	175	587
345	December 11	5	31	109	280
346	December 12	5	28	102	217
347	December 13	5	25	58	96
348	December 14	5	21	52	123
349	December 15	5	20	87	268
350	December 16	5	21	49	92
351	December 17	5	25	38	63
352	December 18	5	24	43	81
353	December 19	5	23	33	41
354	December 20	5	23	45	72
355	December 21	5	24	63	159
356	December 22	5	22	51	85
357	December 23	5	22	131	292
358	December 24	5	33	118	205
359	December 25	5	57	100	141
360	December 26	5	44	66	101
361	December 27	5	38	65	92
362	December 28	5	36	61	92
363	December 29	5	31	57	79
364	December 30	5	32	61	89
365	December 31	5	39	73	137