

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	
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.	

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	16, 17, 20, and 21

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 B, one of four reaches within the Threemile Creek watershed for which ADF&G has submitted a reservation of water application. Reach B begins just upstream of the Hollis Highway Bridge (top of Reach A) and extends upstream to just below the confluence with Anadromous Water Catalog (AWC) Stream Number 103-60-10470-2071-3045 at river mile 2.0 (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.s 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	48
February	26
March	22

April	34
May	64
June	68
July	50
August	44
September	82
October	70
November	63
December	52

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. Mean daily flow data from Stream Gage 15081610 were obtained from the USGS National Water Information System website (<http://waterdata.usgs.gov/nwis>). SAS-based applications¹ were 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 1). This provided an estimate of the percentage of time a given mean daily flow

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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 5 and Table 2). Mean annual flows were estimated as a mean of the annual mean daily flow values for all complete water years of record (Table 3). Mean daily flows are presented in Figure 4 and Table 4.

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 (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. 1962. USGS Criag Quadrangle (C-3), Alaska, 1:63,360 Topographic Map, Copper River Meridian.
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Figure 1. Area map, Threemile Creek near Klawock, Prince of Wales Island, Southeast Alaska.

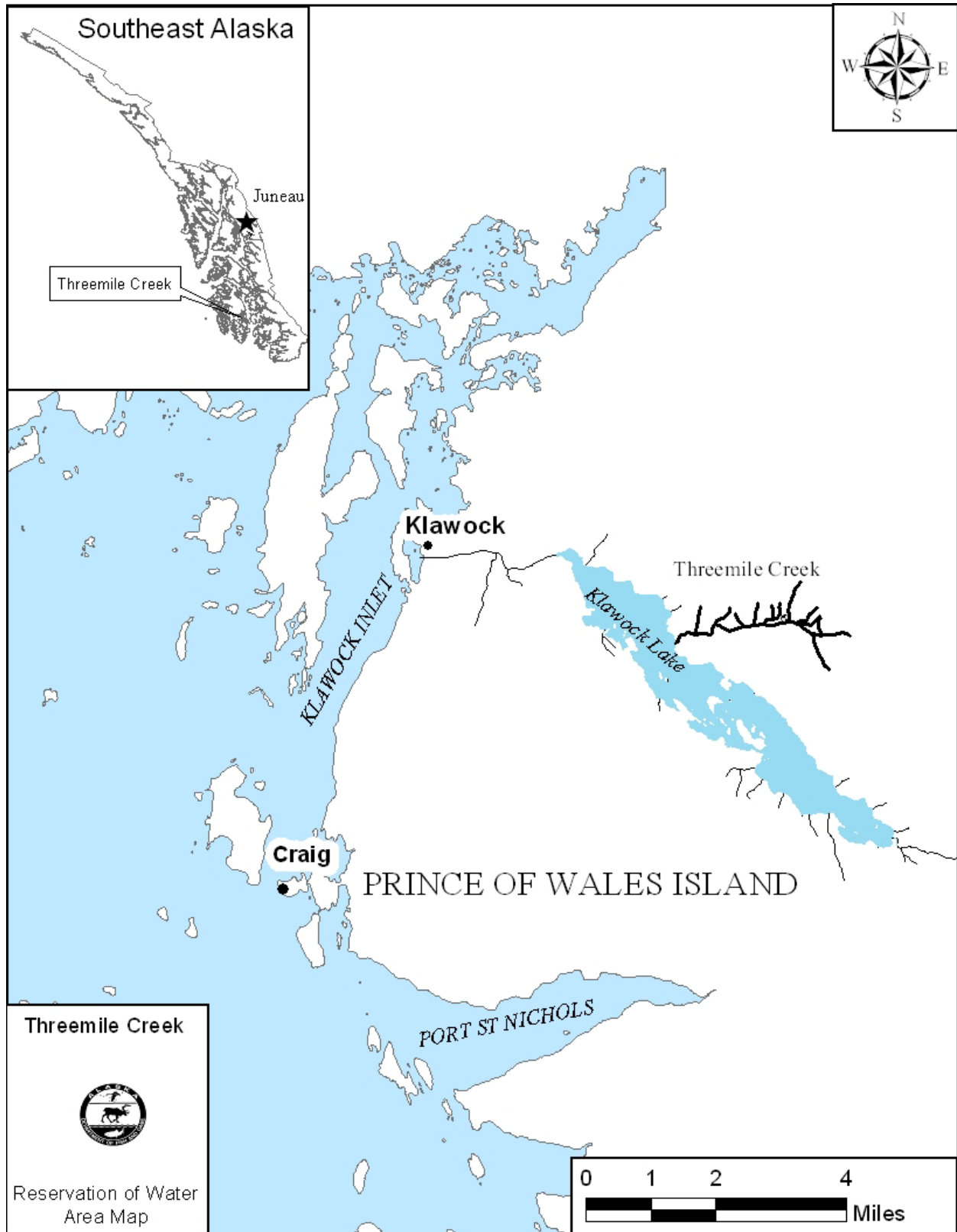


Figure 2. Reservation of Water reach boundaries, Threemile Creek near Klawock, Prince of Wales Island, Southeast Alaska.

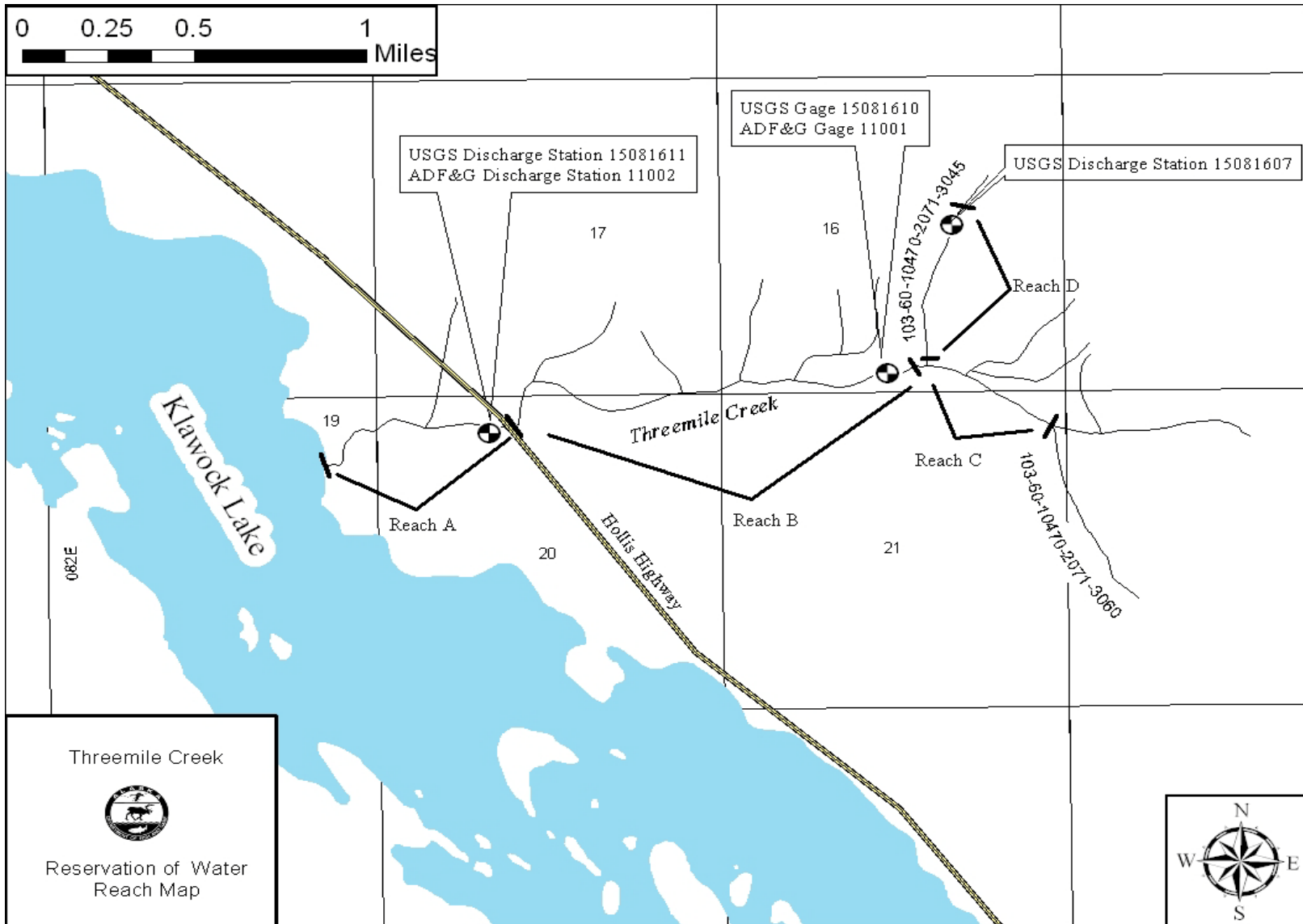


Figure 3. Fish species periodicity chart for Threemile Creek near Klawock, Prince of Wales Island, Southeast Alaska.

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. Annual hydrograph of mean daily flows (cfs) for Threemile Creek Reservation Reach B. 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).

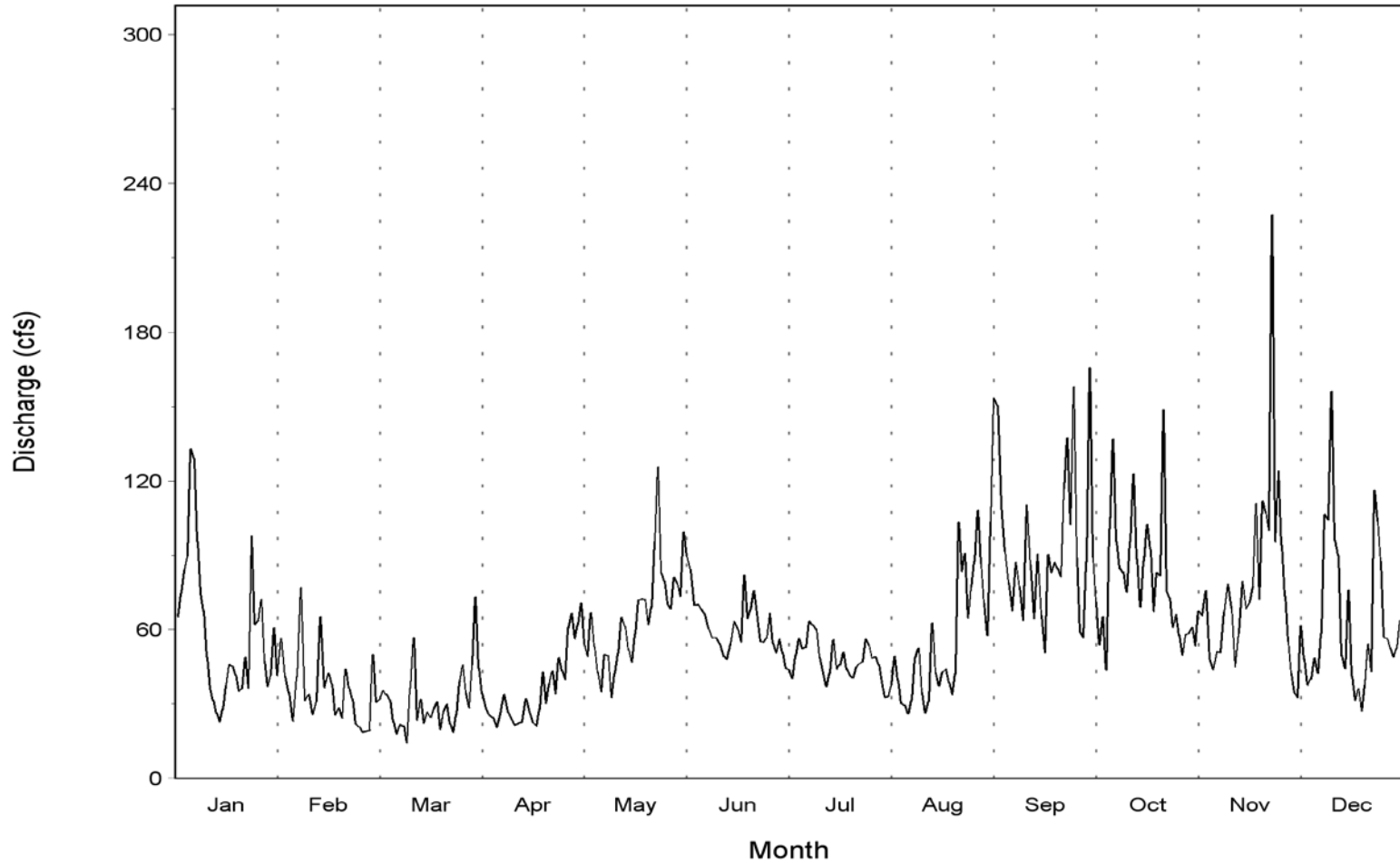


Figure 5. Mean monthly flows and reservation flow requests (cfs) for Threemile Creek Reservation Reach B. Based on complete months of record from USGS gage 15081610 (March 01, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

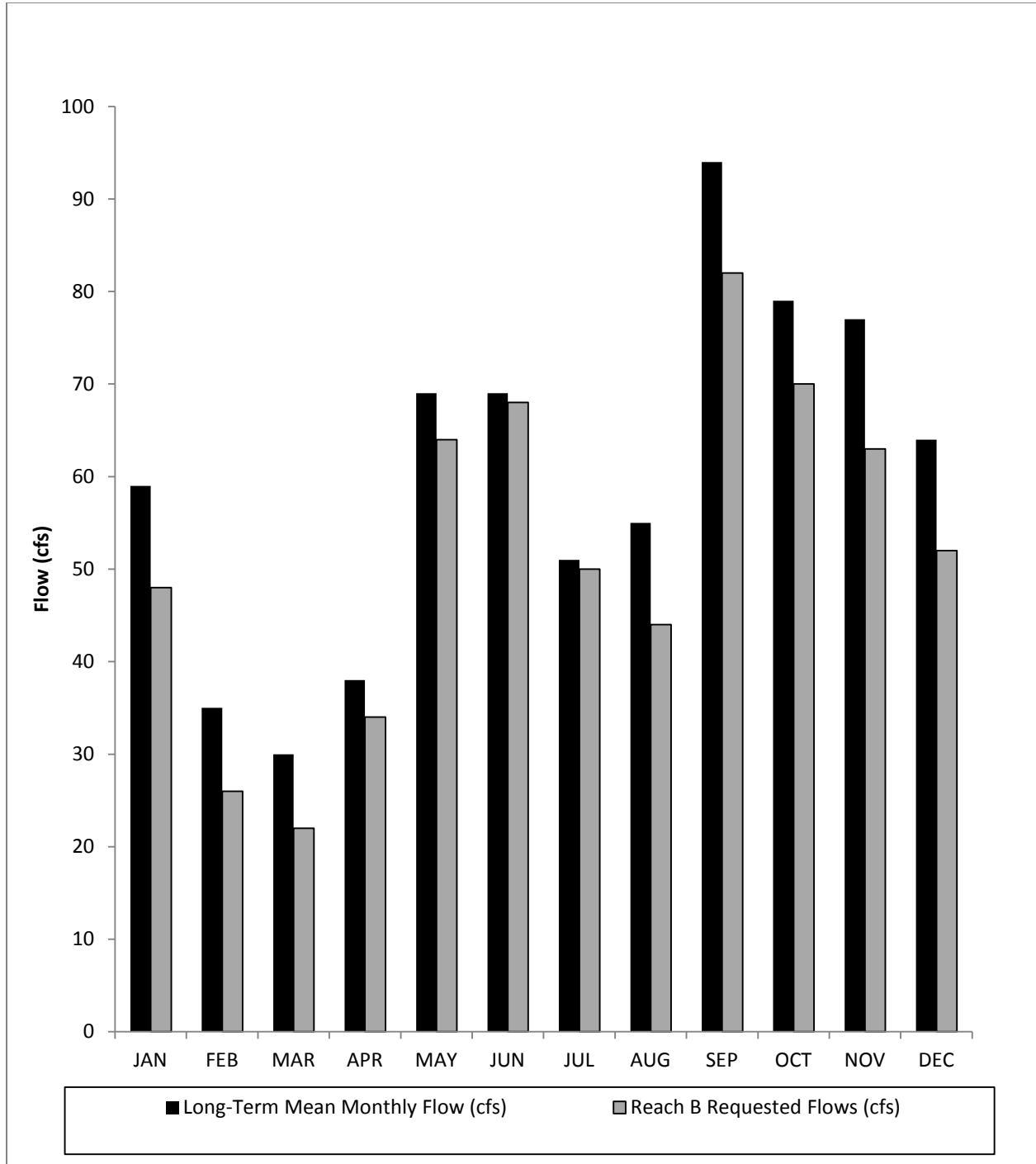


Table 1. Monthly exceedance flows (cfs) for Threemile Creek Reservation Reach B. Based on complete months of record from USGS gage 15081610 (March 01, 1999 to September 30, 2003) and ADFG gage 11001 (October 01, 2005 to September 30, 2006).

% Time exceeded	January	February	March	April	May	June	July	August	September	October	November	December
0	349	275	240	141	447	165	151	272	426	482	773	529
5	155	91	76	89	141	135	97	159	216	153	187	183
10	120	67	58	72	112	104	86	110	180	131	136	125
15	91	58	49	63	102	102	77	88	163	117	110	94
20	79	47	42	56	91	94	72	78	146	108	93	81
25	70	42	37	48	82	89	64	70	128	95	85	71
30	66	35	32	45	77	85	61	64	114	87	77	66
35	60	31	28	40	71	78	55	57	98	79	70	62
40	52	27	25	37	67	73	51	49	88	73	67	56
45	48	26	22	34	64	68	50	44	82	70	63	52
50	44	23	21	31	61	65	46	42	74	64	61	48
55	39	20	18	28	56	60	44	37	70	60	59	41
60	38	19	16	26	53	57	42	35	60	57	53	36
65	34	18	15	24	49	54	40	31	57	54	49	33
70	29	18	14	22	43	51	37	29	54	49	46	28
75	26	17	13	21	39	47	33	27	50	46	41	25
80	23	16	12	19	37	42	28	24	42	45	36	24
85	20	15	11	18	33	39	26	17	36	40	30	21
90	16	14	9.4	16	27	33	22	13	27	33	27	19
95	13	13	8.4	12	25	29	18	10	22	26	19	17
100	11	9.9	7.3	10	18	24	13	8.7	14	19	17	15
Mean	59	35	30	38	69	69	51	55	94	79	77	64

Table 2. Monthly flow statistics (cfs) for Threemile Creek Reservation Reach B. 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	36	59	81
February	5	27	35	48
March	6	16	30	47
April	6	26	38	50
May	6	52	69	89
June	6	43	69	108
July	6	34	51	68
August	6	34	55	91
September	6	58	94	118
October	5	60	79	113
November	5	58	77	135
December	5	48	64	84

Table 3. Mean annual flows (cfs) for Threemile Creek Reservation Reach B. 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	56
2001	365	57
2002	365	59
2003	365	57
2006	365	64
Mean for period of record	1,826	59

Table 4. Mean daily flow statistics (cfs) for Threemile Creek Reservation Reach B. 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).

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	43	65	122
2	January 2	5	32	75	156
3	January 3	5	30	84	155
4	January 4	5	26	90	245
5	January 5	5	45	133	303
6	January 6	5	77	129	235
7	January 7	5	39	95	137
8	January 8	5	65	75	87
9	January 9	5	44	68	110
10	January 10	5	34	49	81
11	January 11	5	29	36	62
12	January 12	5	23	31	58
13	January 13	5	20	26	43
14	January 14	5	16	23	35
15	January 15	5	15	28	49
16	January 16	5	14	38	66
17	January 17	5	13	46	72
18	January 18	5	13	45	66
19	January 19	5	13	42	68
20	January 20	5	12	35	59
21	January 21	5	12	36	61
22	January 22	5	11	49	115
23	January 23	5	11	36	74
24	January 24	5	11	98	349
25	January 25	5	12	62	167
26	January 26	5	14	64	200
27	January 27	5	16	72	120
28	January 28	5	15	47	87
29	January 29	5	15	37	68
30	January 30	5	17	42	70
31	January 31	5	17	61	139

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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	15	42	85
33	February 2	5	24	56	88
34	February 3	5	20	41	70
35	February 4	5	19	34	61
36	February 5	5	17	23	34
37	February 6	5	18	41	120
38	February 7	5	15	77	275
39	February 8	5	14	32	58
40	February 9	5	17	34	67
41	February 10	5	16	26	44
42	February 11	5	16	31	53
43	February 12	5	15	65	185
44	February 13	5	14	37	68
45	February 14	5	14	42	113
46	February 15	5	13	38	113
47	February 16	5	13	26	60
48	February 17	5	13	28	59
49	February 18	5	13	24	43
50	February 19	5	13	44	96
51	February 20	5	12	36	63
52	February 21	5	12	32	67
53	February 22	5	12	22	33
54	February 23	5	11	21	41
55	February 24	5	9.9	19	35
56	February 25	5	10	19	29
57	February 26	5	15	19	27
58	February 27	5	15	50	164
59	February 28 OR 29	6	12	31	58

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Table 4. 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	13	32	51
61	March 2	5	13	35	55
62	March 3	5	13	34	53
63	March 4	5	12	32	81
64	March 5	5	13	23	55
65	March 6	5	12	18	28
66	March 7	5	9.5	22	47
67	March 8	5	8.1	21	47
68	March 9	5	7.3	14	21
69	March 10	5	7.4	37	136
70	March 11	5	7.9	57	240
71	March 12	5	10	24	72
72	March 13	5	10	32	80
73	March 14	5	9.9	22	36
74	March 15	5	9.4	27	54
75	March 16	5	9.0	25	36
76	March 17	5	8.7	28	59
77	March 18	5	8.4	31	76
78	March 19	5	8.1	20	38
79	March 20	5	7.9	27	59
80	March 21	5	8.0	30	58
81	March 22	5	8.1	22	43
82	March 23	5	8.4	19	29
83	March 24	5	8.9	26	42
84	March 25	5	20	39	77
85	March 26	5	17	46	104
86	March 27	5	18	34	67
87	March 28	5	16	29	48
88	March 29	5	15	46	129
89	March 30	5	14	73	208
90	March 31	5	13	44	83

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ATTACHMENT A. THREEMILE CREEK REACH B RESERVATION OF WATER APPLICATION.
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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	11	34	79
92	April 2	5	11	28	64
93	April 3	5	11	25	54
94	April 4	5	11	24	37
95	April 5	5	10	21	31
96	April 6	5	11	26	46
97	April 7	5	11	34	49
98	April 8	5	11	27	40
99	April 9	5	11	24	41
100	April 10	5	18	22	29
101	April 11	5	15	22	33
102	April 12	5	19	23	26
103	April 13	5	16	32	52
104	April 14	5	16	27	41
105	April 15	5	14	22	31
106	April 16	5	14	21	31
107	April 17	5	12	28	47
108	April 18	5	14	43	80
109	April 19	5	16	30	40
110	April 20	5	27	38	63
111	April 21	5	27	43	64
112	April 22	5	26	34	40
113	April 23	5	28	49	128
114	April 24	5	21	43	90
115	April 25	5	19	40	58
116	April 26	5	21	61	141
117	April 27	5	24	66	139
118	April 28	5	33	56	94
119	April 29	5	46	62	87
120	April 30	5	44	71	99

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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	39	54	70
122	May 2	5	33	49	66
123	May 3	5	28	67	136
124	May 4	5	25	53	81
125	May 5	5	21	43	74
126	May 6	5	20	35	60
127	May 7	5	18	50	86
128	May 8	5	18	49	105
129	May 9	5	20	33	43
130	May 10	5	23	43	64
131	May 11	5	24	51	68
132	May 12	5	37	65	112
133	May 13	5	30	61	106
134	May 14	5	27	52	77
135	May 15	5	30	47	64
136	May 16	5	39	58	93
137	May 17	5	30	72	103
138	May 18	5	27	72	102
139	May 19	5	25	72	103
140	May 20	5	24	62	107
141	May 21	5	37	69	108
142	May 22	5	73	96	142
143	May 23	5	72	126	273
144	May 24	5	53	83	123
145	May 25	5	45	80	118
146	May 26	5	44	70	99
147	May 27	5	46	69	93
148	May 28	5	63	81	125
149	May 29	5	61	79	141
150	May 30	5	38	74	113
151	May 31	5	53	99	190

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Table 4. 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	46	90	138
153	June 2	5	39	84	114
154	June 3	5	34	70	89
155	June 4	5	31	70	103
156	June 5	5	29	68	91
157	June 6	5	28	66	98
158	June 7	5	26	60	102
159	June 8	5	26	57	104
160	June 9	5	25	57	102
161	June 10	5	25	54	85
162	June 11	5	24	49	61
163	June 12	5	24	48	60
164	June 13	5	24	54	78
165	June 14	5	25	63	101
166	June 15	5	34	60	95
167	June 16	5	34	55	78
168	June 17	5	47	82	165
169	June 18	5	40	65	102
170	June 19	5	33	68	99
171	June 20	5	29	76	133
172	June 21	5	40	65	115
173	June 22	5	36	55	87
174	June 23	5	32	55	84
175	June 24	5	30	57	81
176	June 25	5	33	66	89
177	June 26	5	37	54	64
178	June 27	5	37	51	57
179	June 28	5	31	56	72
180	June 29	5	33	51	59
181	June 30	5	31	44	58

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Table 4. 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	31	44	61
183	July 2	5	28	40	51
184	July 3	5	24	50	87
185	July 4	5	22	56	100
186	July 5	5	20	52	82
187	July 6	5	20	53	102
188	July 7	5	24	63	151
189	July 8	5	33	62	115
190	July 9	5	30	60	112
191	July 10	5	28	49	84
192	July 11	5	27	43	62
193	July 12	5	26	37	51
194	July 13	5	26	43	68
195	July 14	5	25	56	133
196	July 15	5	25	44	80
197	July 16	5	23	46	72
198	July 17	5	20	51	75
199	July 18	5	18	44	59
200	July 19	5	16	42	82
201	July 20	5	17	41	77
202	July 21	5	22	45	62
203	July 22	5	23	46	64
204	July 23	5	27	47	68
205	July 24	5	27	56	110
206	July 25	5	18	54	86
207	July 26	5	16	49	92
208	July 27	5	15	49	97
209	July 28	5	18	46	78
210	July 29	5	16	39	72
211	July 30	5	14	33	64
212	July 31	5	13	33	59

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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	13	38	71
214	August 2	5	15	49	101
215	August 3	5	17	39	70
216	August 4	5	13	30	42
217	August 5	5	12	29	49
218	August 6	5	11	26	45
219	August 7	5	10	32	72
220	August 8	5	10	49	114
221	August 9	5	9.7	53	116
222	August 10	5	9.3	34	66
223	August 11	5	9.0	27	48
224	August 12	5	8.7	31	70
225	August 13	5	9.3	63	195
226	August 14	5	11	42	78
227	August 15	5	11	37	59
228	August 16	5	10	43	86
229	August 17	5	9.9	44	75
230	August 18	5	10	39	64
231	August 19	5	12	34	57
232	August 20	5	27	42	70
233	August 21	5	43	103	272
234	August 22	5	35	84	158
235	August 23	5	29	91	217
236	August 24	5	27	65	114
237	August 25	5	30	77	165
238	August 26	5	29	88	182
239	August 27	5	27	108	215
240	August 28	5	26	87	157
241	August 29	5	30	70	110
242	August 30	5	36	58	110
243	August 31	5	46	104	210

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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	35	153	286
245	September 2	5	27	150	289
246	September 3	5	22	110	200
247	September 4	5	39	92	143
248	September 5	5	31	79	138
249	September 6	5	27	68	96
250	September 7	5	56	87	131
251	September 8	5	57	77	112
252	September 9	5	37	64	108
253	September 10	5	26	110	180
254	September 11	5	23	86	170
255	September 12	5	24	65	98
256	September 13	5	20	90	260
257	September 14	5	17	66	148
258	September 15	5	15	51	87
259	September 16	5	14	90	211
260	September 17	5	17	83	186
261	September 18	5	28	87	167
262	September 19	5	23	85	135
263	September 20	5	43	81	126
264	September 21	5	34	117	239
265	September 22	5	28	137	256
266	September 23	5	25	102	183
267	September 24	5	22	158	384
268	September 25	5	20	89	162
269	September 26	5	18	59	84
270	September 27	5	18	57	117
271	September 28	5	38	87	221
272	September 29	5	37	166	426
273	September 30	5	34	89	200

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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	49	71	121
275	October 2	5	36	54	94
276	October 3	5	45	65	110
277	October 4	5	26	44	60
278	October 5	5	19	101	349
279	October 6	5	31	137	426
280	October 7	5	46	95	148
281	October 8	5	58	85	135
282	October 9	5	51	83	136
283	October 10	5	41	75	117
284	October 11	5	46	96	153
285	October 12	5	51	123	207
286	October 13	5	49	88	178
287	October 14	5	36	69	124
288	October 15	5	46	88	134
289	October 16	5	45	102	166
290	October 17	5	37	92	138
291	October 18	5	31	68	129
292	October 19	5	50	83	138
293	October 20	5	45	82	137
294	October 21	5	38	149	482
295	October 22	5	33	75	95
296	October 23	5	29	73	131
297	October 24	5	26	61	96
298	October 25	5	24	66	114
299	October 26	5	26	58	83
300	October 27	5	33	50	79
301	October 28	5	27	58	126
302	October 29	5	23	59	96
303	October 30	5	21	61	80
304	October 31	5	20	54	70

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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	18	68	92
306	November 2	5	18	66	101
307	November 3	5	17	76	132
308	November 4	5	17	48	65
309	November 5	5	19	44	59
310	November 6	5	28	51	63
311	November 7	5	27	51	71
312	November 8	5	22	67	116
313	November 9	5	19	78	197
314	November 10	5	18	69	170
315	November 11	5	18	45	70
316	November 12	5	36	59	87
317	November 13	5	38	79	187
318	November 14	5	31	69	114
319	November 15	5	27	71	105
320	November 16	5	30	77	110
321	November 17	5	53	111	261
322	November 18	5	43	72	149
323	November 19	5	45	112	270
324	November 20	5	55	107	179
325	November 21	5	49	100	187
326	November 22	5	61	227	773
327	November 23	5	41	96	207
328	November 24	5	32	124	343
329	November 25	5	36	94	246
330	November 26	5	28	74	140
331	November 27	5	24	55	95
332	November 28	5	22	42	61
333	November 29	5	19	34	50
334	November 30	5	17	33	51

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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	15	61	173
336	December 2	5	15	48	132
337	December 3	5	16	38	67
338	December 4	5	17	40	63
339	December 5	5	17	48	120
340	December 6	5	19	43	97
341	December 7	5	29	59	112
342	December 8	5	37	106	297
343	December 9	5	33	104	238
344	December 10	5	28	156	529
345	December 11	5	25	96	251
346	December 12	5	23	90	194
347	December 13	5	20	49	84
348	December 14	5	16	44	109
349	December 15	5	15	76	240
350	December 16	5	16	41	81
351	December 17	5	20	32	54
352	December 18	5	19	36	71
353	December 19	5	18	27	34
354	December 20	5	18	38	63
355	December 21	5	19	54	141
356	December 22	5	17	43	74
357	December 23	5	17	116	262
358	December 24	5	27	104	183
359	December 25	5	49	87	125
360	December 26	5	37	57	89
361	December 27	5	32	56	81
362	December 28	5	30	52	81
363	December 29	5	25	49	69
364	December 30	5	26	53	78
365	December 31	5	33	64	121