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

Alaska Department of NATURAL RESOURCES

Anchorage Office 550 West 7th 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 #*** 28751	***For ADNR Use Only*** CID # 19293	***For ADNR Use Only*** ***Receipt Type*** ***WR***	DEPT. OF NATURAL RESOURCES DIV. OF MINING, LAND & WATER OCT 24 2012 WATER RESOURCES SECTION ANCHORAGE

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

Alaska Department of Fish and Game Organization Name (if applicable)	Joe Klein Agent or Consultant Name (if applicable)
Individual Applicant Name (if applicable)	Individual Co-applicant Name (if applicable)

ADF&G SF/RTS, 333 Raspberry Rd Mailing Address	Anchorage City	AK State	99518 Zip Code

907-267-2148 Daytime Phone Number	Alternate Phone Number (optional)
907-267-2422 Fax Number (optional)	joe.klein@alaska.gov E-Mail Address (optional)

LOCATION OF PROPOSED RESERVATION OF WATER

Geographic Name of Waterbody RUSSIAN RIVER

Meridian	Township	Range	Section	Quarter Sections	
See Attachment A				¼	¼
				¼	¼

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.

See Attachment A

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).

[x] 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.

See Appendix A

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

[x] Yes

[ ] No If no, when will use for this purpose begin? Specify approximate date ____________

WATER QUANTITY

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

[x] 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.

See Attachment A

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]	October 24, 2012
Signature	Date
Joe Klein	ADF&G, Aquatic Res Supervisor
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
Seward	5N	4W	33,34
Seward	4N	4W	4,9

Russian River is located in Southcentral Alaska near Cooper Landing (Figure 1). This proposed reservation of water applies to stream flows within the Russian River and its floodplain from its mouth with the Kenai River upstream approximately 5.0 river miles to the Lower Russian Lake (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, 1994) topographic data.

Russian River flows northward from Upper Russian Lake in the Kenai Mountains through Lower Russian Lake, draining into the Kenai River. The Russian River watershed association covers approximately 67 square miles. The watershed is characterized by a glacially sculpted valley flowing north into the Kenai River. The majority of the watershed is undeveloped, although the area around Russian River Campground and the lower portion of the Russian River receive heavy recreational use as a result of the high fishery values. (U.S. Department of Agriculture 2004).

The climate of the Russian River watershed is cool and moist. The average daily temperature at Cooper Landing and the mouth of the Russian River is about 36 F. The average maximum July temperature at the mouth of the Russian River is about 68 degrees F, and the average minimum January temperature is about 11 degrees F (U.S. Department of Agriculture 2004).

Because the watershed lies in a rain shadow created by the eastern Kenai Mountains, which capture much of the moisture in storms that circulate over Prince William Sound, it receives considerably less precipitation than the coastal areas. Average annual precipitation ranges from about 20 inches at the mouth of the Russian River to over 60 inches at the high elevations at the head of the watershed (U.S. Department of Agriculture 2004).

WATER USE

The primary purpose of this proposed reservation is to protect fish habitat, migration and propagation within Russian River and its watershed. This reach has been specified as important to anadromous fish (under AS 16.05.871) as Anadromous Water Catalog stream number 244-30-10010-2158 by the Alaska Department of Fish and Game (Johnson and Blanche 2010). Chinook (*Oncorhynchus tshawytscha),* coho (*O. kisutch*), and sockeye salmon (*O. nerka*), rainbow trout (*O. mykiss*), and Dolly Varden (*Salvelinus malma*), utilize this reach of the Russian River for a portion of, or all of their spawning, incubation, rearing, and passage life phases (J. Pawluk, Fisheries Biologist, ADF&G, Soldotna, Alaska, October 15, 2012; Figure 3). These species contribute to sport and commercial 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 Flow (cfs)
January	29
February	23
March	26
Apr 1-15	26
Apr 16-23	33
Apr 24-30	56
May 1-7	70
May 8-15	142
May 16-23	173
May 24-31	190
June	209
Jul 1-15	176
Jul 16-31	127
Aug 1-15	100
Aug 16-31	82
September	82
October	110
November	85
December	43

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 hydrologic analyses (Annear et al. 2004) combined with available fish use information. Hydrologic information included seasonal and annual summaries of the available hydrologic data. 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 organisms 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:

Mean daily flow data for the entire period of record were obtained from United State Geological Survey (USGS) National Water Information System website (http://waterdata.usgs.gov/nwis) for the Russian River Gage (No. 15264000). This gage is located at Latitude 60°27'10", Longitude 149°59'05" approximately 4.8 miles upstream from the confluence with the Kenai River (Figure 2) and has a period of record from May 1, 1947 to September 30, 1954. SAS-based applications[1] were used to calculate annual, monthly, mean daily, and flow duration summaries.

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 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 (Table 2). Mean annual flow was 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 (Figure 5). 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 specificed time periods. Flows within the 25 to 75% excceedence 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).

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[1] Specific product titles described do not constitute product endorsements. Copyright, SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.

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 this River.

REFERENCES

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Figure 1.–Area map of Russian River near Cooper Landing, Alaska.

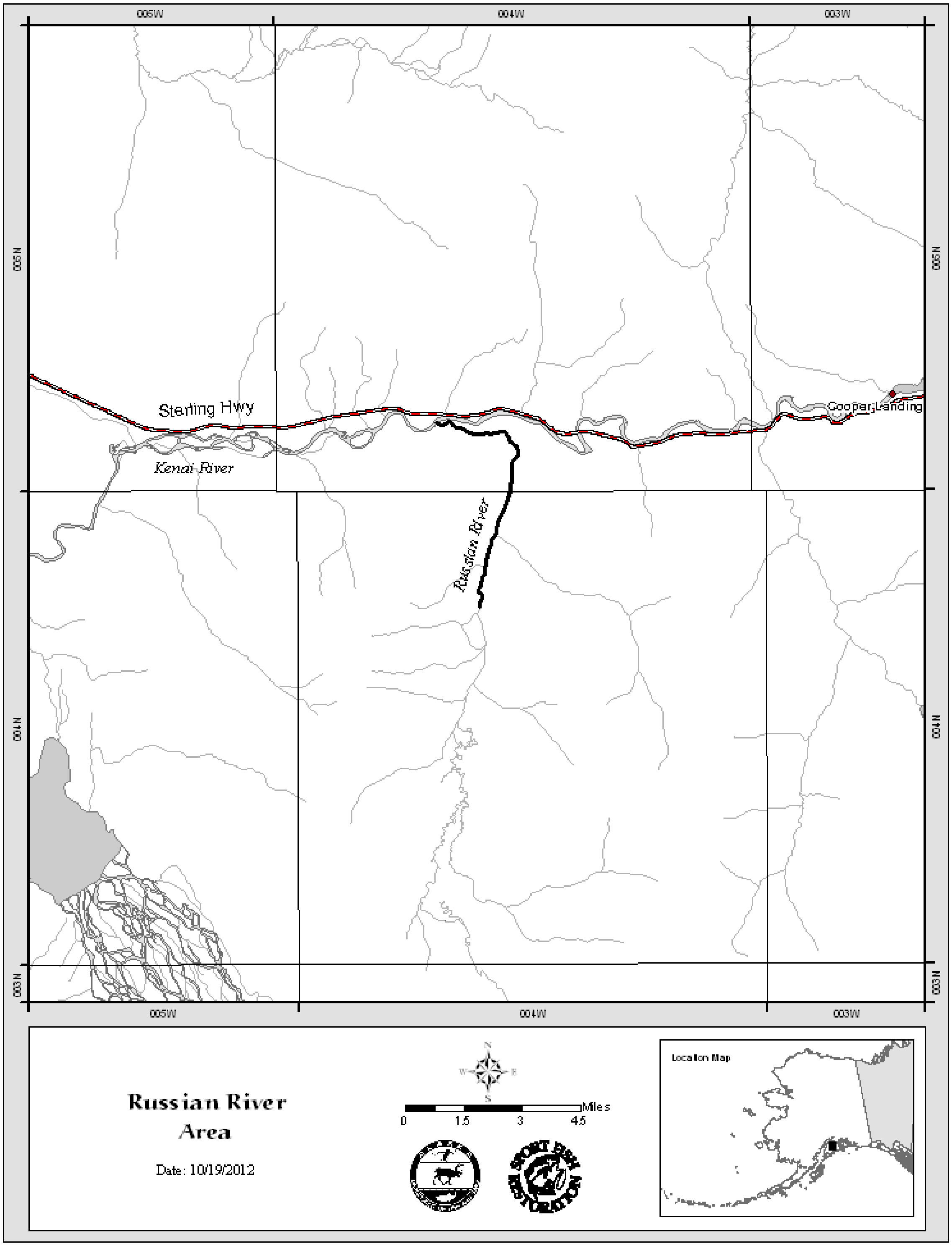

Figure 2.–Reach map of Russian River near Cooper Landing, Alaska.

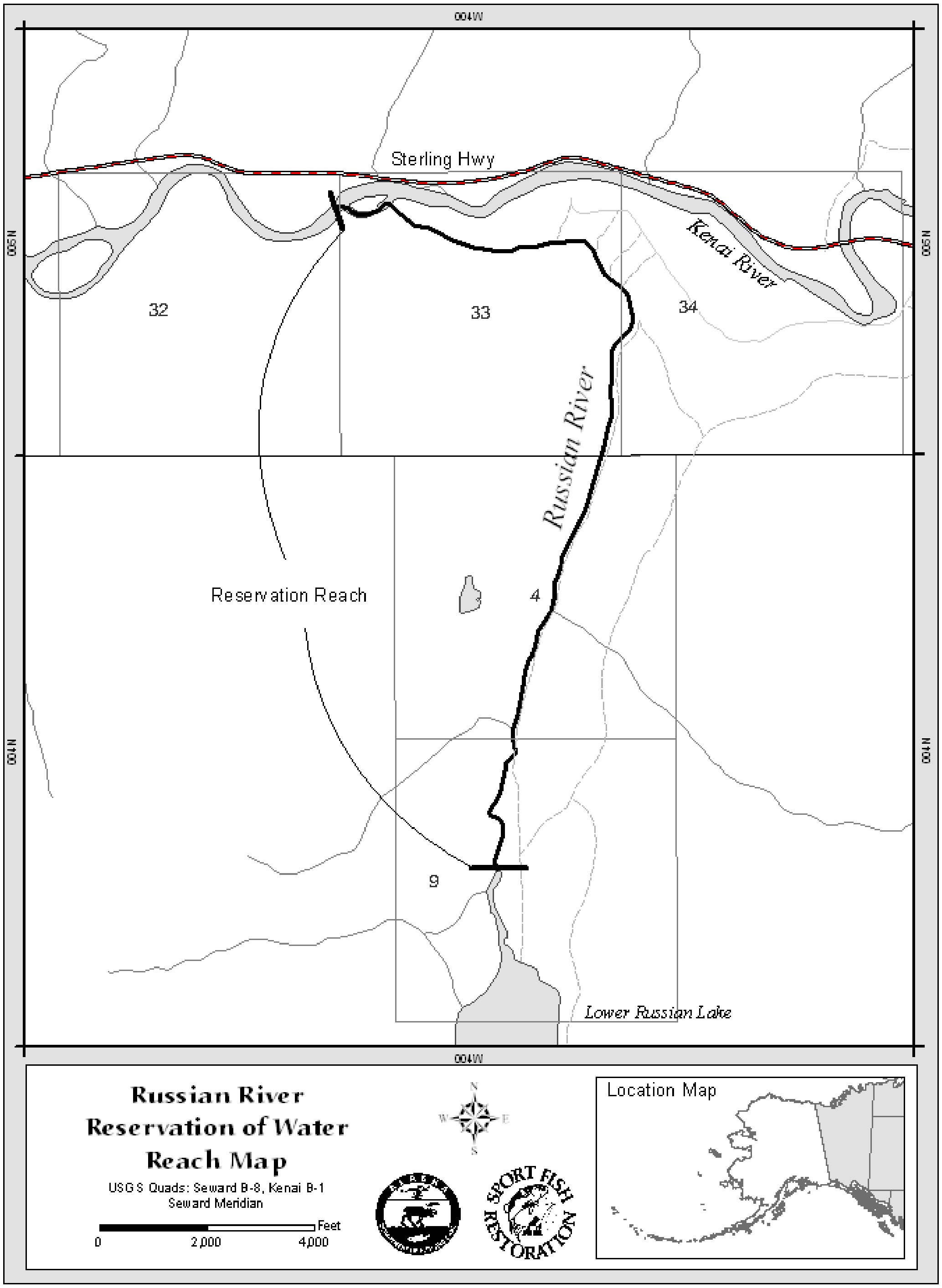

Figure 3.–Fish species periodicity chart for Russian River near Cooper Landing, Alaska.

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

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

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

Rainbow Trout	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage												
Spawning					XXXX	XXXX						
Incubation					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												
Adult Passage												
Spawning									XXXX	XXXX	XXXX	
Incubation	XXXX	XXXX	XXXX	XXXX					XXXX	XXXX	XXXX	XXXX
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 steelhead and resident fish species, immigration and emigration.

Incubation life phase includes time of egg deposition to fry emergence

? = Data not available or timing is incomplete

Table 1.–Exceedance flows (in cfs) for USGS gaging site 15264000 (RUSSIAN R NR COOPER LANDING AK), based on complete months of record (May 1, 1947 to September 30, 1954). Complete period of record for the gage is May 1, 1947 to September 30, 1954.

% Time exceeded	Jan	Feb	Mar	Apr 1-15	Apr 16-23	Apr 24-30	May 1-7	May 8-15	May 16-23	May 24-31	Jun	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sep	Oct	Nov	Dec
0	166	90	67	62	132	229	311	527	471	470	992	740	339	353	231	370	743	1,200	640
5	130	88	52	39	128	164	300	494	450	420	520	395	276	288	202	241	453	650	260
10	88	79	46	38	74	136	271	363	440	410	430	312	261	246	177	191	334	495	240
15	70	62	41	38	70	73	130	295	418	400	354	253	192	174	139	172	233	356	190
20	60	54	36	36	64	72	110	280	408	390	291	215	181	167	135	160	190	310	180
25	58	46	33	32	57	69	100	265	355	367	271	203	157	151	103	140	174	250	110
30	53	40	30	31	54	65	92	229	320	306	256	198	150	128	96	130	157	185	89
35	48	40	29	28	39	60	86	210	282	290	250	194	144	119	93	109	140	150	82
40	44	37	28	28	36	58	80	190	221	270	242	190	140	113	90	98	132	120	65
45	38	33	27	27	36	57	74	164	205	258	234	185	138	111	88	92	130	109	51
50	36	30	27	26	36	57	73	159	183	240	228	181	133	107	86	89	120	96	49
55	32	28	26	26	35	57	71	150	175	230	220	180	130	104	84	85	116	88	48
60	29	23	26	26	33	56	70	142	173	190	209	176	127	100	82	82	110	85	43
65	28	23	26	25	32	49	68	136	166	177	200	171	124	98	81	80	103	80	42
70	26	23	23	24	28	43	64	120	159	166	196	167	122	98	79	76	98	73	41
75	25	22	23	24	27	42	62	74	158	163	190	163	119	95	77	74	93	68	37
80	23	22	21	24	24	40	57	61	110	144	177	156	114	92	71	65	82	60	30
85	23	20	21	24	24	36	49	59	97	140	170	150	114	90	66	57	72	54	30
90	23	20	18	20	21	21	30	56	73	97	165	141	102	70	61	53	71	46	28
95	22	19	18	20	21	21	30	56	56	97	156	135	87	65	60	46	60	36	26
100	20	18	18	20	21	21	30	30	56	97	132	126	75	62	53	34	45	36	26
Mean	49	38	30	29	46	66	100	189	235	252	262	209	150	132	100	111	162	189	95

Table 2.–Monthly flow summaries (in cfs) for USGS gaging site 15264000 (RUSSIAN R NR COOPER LANDING AK), based on complete months of record (May 1, 1947 to September 30, 1954). Complete period of record for the gage is May 1, 1947 to September 30, 1954.

Month	# of Months	Minimum monthly flow (cfs)	Mean monthly flow (cfs)	Maximum monthly flow (cfs)
January	7	24	49	123
February	7	20	38	85
March	7	18	30	55
April	7	21	42	82
May	8	62	197	358
June	8	174	262	543
July	8	122	179	347
August	8	63	115	239
September	8	47	111	170
October	7	84	162	349
November	7	40	189	465
December	7	27	95	231

Table 3.–Annual flow summaries (in cfs) for USGS gaging site 15264000 (RUSSIAN R NR COOPER LANDING AK), based on complete water years of record (October 1, 1947 to September 30, 1954). Complete period of record for the gage is May 1, 1947 to September 30, 1954.

Water year	Number of days of record	QAA (cfs)
1948	366	128
1949	365	85
1950	365	122
1951	365	78
1952	366	78
1953	365	254
1954	365	126
Mean for period of record	2,557	124

Table 4.–Daily flow summaries (in cfs) for USGS gaging site 15264000 (RUSSIAN R NR COOPER LANDING AK), based on complete water years of record (October 1, 1947 to September 30, 1954). Complete period of record for the gage is May 1, 1947 to September 30, 1954.

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	7	25	60	160
2	January 2	7	25	59	160
3	January 3	7	25	58	160
4	January 4	7	25	57	160
5	January 5	7	25	57	160
6	January 6	7	25	57	160
7	January 7	7	25	56	160
8	January 8	7	25	56	166
9	January 9	7	25	51	130
10	January 10	7	25	51	130
11	January 11	7	25	52	130
12	January 12	7	25	53	130
13	January 13	7	25	52	130
14	January 14	7	25	51	130
15	January 15	7	25	50	130
16	January 16	7	23	48	130
17	January 17	7	23	48	130
18	January 18	7	22	49	130
19	January 19	7	22	49	130
20	January 20	7	23	48	130
21	January 21	7	23	42	88
22	January 22	7	22	41	88
23	January 23	7	21	40	88
24	January 24	7	21	41	88
25	January 25	7	21	42	88
26	January 26	7	20	42	88
27	January 27	7	20	41	88
28	January 28	7	20	41	88
29	January 29	7	20	40	88
30	January 30	7	20	40	88
31	January 31	7	20	39	88

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Table 4.–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	7	20	39	79
33	February 2	7	19	40	79
34	February 3	7	19	40	79
35	February 4	7	20	40	79
36	February 5	7	20	39	79
37	February 6	7	20	39	79
38	February 7	7	19	39	79
39	February 8	7	18	38	79
40	February 9	7	18	38	79
41	February 10	7	18	39	79
42	February 11	7	18	40	88
43	February 12	7	19	40	88
44	February 13	7	20	40	88
45	February 14	7	21	39	88
46	February 15	7	21	39	88
47	February 16	7	20	38	88
48	February 17	7	20	38	88
49	February 18	7	19	38	88
50	February 19	7	19	38	88
51	February 20	7	19	38	88
52	February 21	7	19	38	90
53	February 22	7	20	38	90
54	February 23	7	20	38	90
55	February 24	7	20	38	90
56	February 25	7	20	37	90
57	February 26	7	20	38	90
58	February 27	7	20	36	82
59	February 28 OR 29	9	20	35	80

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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	7	18	32	67
61	March 2	7	18	33	67
62	March 3	7	18	32	67
63	March 4	7	18	32	67
64	March 5	7	18	32	67
65	March 6	7	18	32	67
66	March 7	7	18	32	67
67	March 8	7	18	33	67
68	March 9	7	18	33	67
69	March 10	7	18	33	67
70	March 11	7	18	30	52
71	March 12	7	18	30	52
72	March 13	7	18	30	52
73	March 14	7	18	30	52
74	March 15	7	18	30	52
75	March 16	7	18	30	52
76	March 17	7	18	30	52
77	March 18	7	18	29	52
78	March 19	7	18	29	52
79	March 20	7	18	30	52
80	March 21	7	18	29	46
81	March 22	7	18	29	46
82	March 23	7	18	29	46
83	March 24	7	18	29	46
84	March 25	7	18	28	46
85	March 26	7	18	28	46
86	March 27	7	18	28	46
87	March 28	7	18	28	46
88	March 29	7	18	28	46
89	March 30	7	18	28	46
90	March 31	7	18	28	46

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Table 4.–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	7	20	28	38
92	April 2	7	20	28	38
93	April 3	7	20	28	38
94	April 4	7	20	27	38
95	April 5	7	20	27	38
96	April 6	7	20	27	38
97	April 7	7	20	27	38
98	April 8	7	20	28	38
99	April 9	7	20	28	38
100	April 10	7	20	28	38
101	April 11	7	20	30	38
102	April 12	7	20	30	42
103	April 13	7	20	31	48
104	April 14	7	20	32	56
105	April 15	7	20	34	62
106	April 16	7	21	35	70
107	April 17	7	21	37	74
108	April 18	7	21	38	74
109	April 19	7	21	44	92
110	April 20	7	21	48	114
111	April 21	7	21	54	132
112	April 22	7	21	54	128
113	April 23	7	21	54	132
114	April 24	7	21	56	130
115	April 25	7	21	57	130
116	April 26	7	21	60	136
117	April 27	7	21	65	152
118	April 28	7	21	68	164
119	April 29	7	21	75	198
120	April 30	7	21	81	229

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Table 4.–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	7	30	87	249
122	May 2	7	30	92	271
123	May 3	7	30	95	280
124	May 4	7	30	100	290
125	May 5	7	30	105	300
126	May 6	7	30	116	311
127	May 7	7	30	125	311
128	May 8	7	30	145	300
129	May 9	7	30	164	363
130	May 10	7	30	179	410
131	May 11	7	56	194	454
132	May 12	7	56	207	494
133	May 13	7	56	219	527
134	May 14	7	56	223	527
135	May 15	7	56	228	499
136	May 16	7	56	233	471
137	May 17	7	56	237	446
138	May 18	7	56	242	415
139	May 19	7	56	244	430
140	May 20	7	56	249	450
141	May 21	7	97	254	460
142	May 22	7	97	247	450
143	May 23	7	97	241	440
144	May 24	7	97	239	420
145	May 25	7	97	241	410
146	May 26	7	97	241	395
147	May 27	7	97	243	390
148	May 28	7	97	242	410
149	May 29	7	97	240	430
150	May 30	7	97	236	450
151	May 31	7	97	234	470

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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	7	154	246	490
153	June 2	7	158	249	510
154	June 3	7	160	249	520
155	June 4	7	170	249	520
156	June 5	7	170	257	520
157	June 6	7	170	263	500
158	June 7	7	160	262	480
159	June 8	7	150	263	490
160	June 9	7	160	264	510
161	June 10	7	160	261	520
162	June 11	7	173	260	530
163	June 12	7	189	258	520
164	June 13	7	179	253	490
165	June 14	7	169	247	460
166	June 15	7	160	244	430
167	June 16	7	154	245	400
168	June 17	7	148	244	370
169	June 18	7	142	260	370
170	June 19	7	136	277	430
171	June 20	7	132	285	480
172	June 21	7	140	281	420
173	June 22	7	150	279	430
174	June 23	7	156	273	460
175	June 24	7	156	270	530
176	June 25	7	160	278	631
177	June 26	7	162	295	764
178	June 27	7	166	320	920
179	June 28	7	169	330	992
180	June 29	7	169	316	942
181	June 30	7	164	294	838

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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	7	158	273	740
183	July 2	7	154	252	638
184	July 3	7	154	238	568
185	July 4	7	156	227	510
186	July 5	7	156	220	453
187	July 6	7	154	228	409
188	July 7	7	154	226	381
189	July 8	7	150	216	364
190	July 9	7	144	207	345
191	July 10	7	142	200	313
192	July 11	7	140	199	306
193	July 12	7	136	195	300
194	July 13	7	134	193	306
195	July 14	7	132	190	321
196	July 15	7	128	186	334
197	July 16	7	126	184	339
198	July 17	7	134	180	329
199	July 18	7	130	174	308
200	July 19	7	124	170	308
201	July 20	7	114	165	303
202	July 21	7	111	159	278
203	July 22	7	102	156	268
204	July 23	7	95	154	261
205	July 24	7	93	153	261
206	July 25	7	87	150	266
207	July 26	7	84	146	276
208	July 27	7	81	141	273
209	July 28	7	79	139	268
210	July 29	7	79	134	256
211	July 30	7	78	131	240
212	July 31	7	75	130	227

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Table 4.–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	7	74	131	233
214	August 2	7	71	137	278
215	August 3	7	69	142	334
216	August 4	7	69	144	353
217	August 5	7	69	141	332
218	August 6	7	69	137	295
219	August 7	7	71	135	283
220	August 8	7	67	136	283
221	August 9	7	66	136	288
222	August 10	7	64	136	298
223	August 11	7	64	133	288
224	August 12	7	64	130	266
225	August 13	7	62	127	247
226	August 14	7	63	125	244
227	August 15	7	62	122	242
228	August 16	7	63	117	229
229	August 17	7	61	112	216
230	August 18	7	61	107	196
231	August 19	7	60	102	177
232	August 20	7	60	99	158
233	August 21	7	57	96	142
234	August 22	7	57	98	152
235	August 23	7	55	103	192
236	August 24	7	53	103	190
237	August 25	7	55	103	198
238	August 26	7	55	102	207
239	August 27	7	61	100	198
240	August 28	7	60	103	231
241	August 29	7	61	102	231
242	August 30	7	63	99	216
243	August 31	7	62	96	202

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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	7	58	95	188
245	September 2	7	58	93	175
246	September 3	7	58	92	166
247	September 4	7	55	96	177
248	September 5	7	53	106	229
249	September 6	7	52	114	261
250	September 7	7	52	117	259
251	September 8	7	49	113	220
252	September 9	7	47	111	200
253	September 10	7	49	111	192
254	September 11	7	47	109	177
255	September 12	7	45	107	160
256	September 13	7	44	104	170
257	September 14	7	42	97	160
258	September 15	7	44	95	160
259	September 16	7	47	102	170
260	September 17	7	53	120	260
261	September 18	7	53	127	240
262	September 19	7	52	146	350
263	September 20	7	49	147	370
264	September 21	7	47	144	370
265	September 22	7	47	144	350
266	September 23	7	45	142	320
267	September 24	7	43	134	250
268	September 25	7	42	124	220
269	September 26	7	40	120	200
270	September 27	7	37	124	190
271	September 28	7	34	119	194
272	September 29	7	35	114	188
273	September 30	7	37	107	173

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Table 4.–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	7	45	116	160
275	October 2	7	52	115	174
276	October 3	7	56	121	187
277	October 4	7	57	174	493
278	October 5	7	57	202	687
279	October 6	7	57	215	743
280	October 7	7	57	230	740
281	October 8	7	82	236	656
282	October 9	7	93	227	562
283	October 10	7	88	214	504
284	October 11	7	85	199	453
285	October 12	7	84	184	395
286	October 13	7	79	174	361
287	October 14	7	75	167	350
288	October 15	7	71	163	334
289	October 16	7	67	157	329
290	October 17	7	63	156	308
291	October 18	7	60	145	278
292	October 19	7	60	141	252
293	October 20	7	60	137	233
294	October 21	7	64	134	220
295	October 22	7	64	131	209
296	October 23	7	60	134	202
297	October 24	7	71	130	188
298	October 25	7	71	127	179
299	October 26	7	71	132	192
300	October 27	7	71	131	194
301	October 28	7	71	140	252
302	October 29	7	71	160	418
303	October 30	7	71	161	432
304	October 31	7	71	159	401

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Table 4.–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	7	49	160	392
306	November 2	7	49	166	364
307	November 3	7	49	162	329
308	November 4	7	49	155	321
309	November 5	7	49	154	342
310	November 6	7	49	149	332
311	November 7	7	49	155	348
312	November 8	7	49	172	468
313	November 9	7	49	170	489
314	November 10	7	42	171	510
315	November 11	7	36	171	537
316	November 12	7	36	162	501
317	November 13	7	36	148	441
318	November 14	7	36	134	373
319	November 15	7	36	127	356
320	November 16	7	36	120	329
321	November 17	7	36	114	298
322	November 18	7	36	109	273
323	November 19	7	36	108	252
324	November 20	7	36	120	295
325	November 21	7	36	156	348
326	November 22	7	36	247	627
327	November 23	7	36	337	772
328	November 24	7	36	395	1,200
329	November 25	7	36	327	956
330	November 26	7	36	275	760
331	November 27	7	36	263	640
332	November 28	7	36	267	798
333	November 29	7	36	243	750
334	November 30	7	36	220	700

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Table 4.–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	7	28	186	640
336	December 2	7	28	175	580
337	December 3	7	28	164	520
338	December 4	7	28	148	420
339	December 5	7	28	133	340
340	December 6	7	28	119	250
341	December 7	7	28	109	240
342	December 8	7	28	102	240
343	December 9	7	28	97	240
344	December 10	7	28	95	240
345	December 11	7	28	84	190
346	December 12	7	28	81	190
347	December 13	7	28	79	190
348	December 14	7	28	78	190
349	December 15	7	28	77	190
350	December 16	7	26	75	190
351	December 17	7	26	73	190
352	December 18	7	26	72	190
353	December 19	7	26	72	190
354	December 20	7	26	72	190
355	December 21	7	26	82	260
356	December 22	7	26	81	260
357	December 23	7	26	81	260
358	December 24	7	26	80	260
359	December 25	7	26	79	260
360	December 26	7	26	78	260
361	December 27	7	26	77	260
362	December 28	7	26	76	260
363	December 29	7	26	75	260
364	December 30	7	26	75	260
365	December 31	7	26	75	260

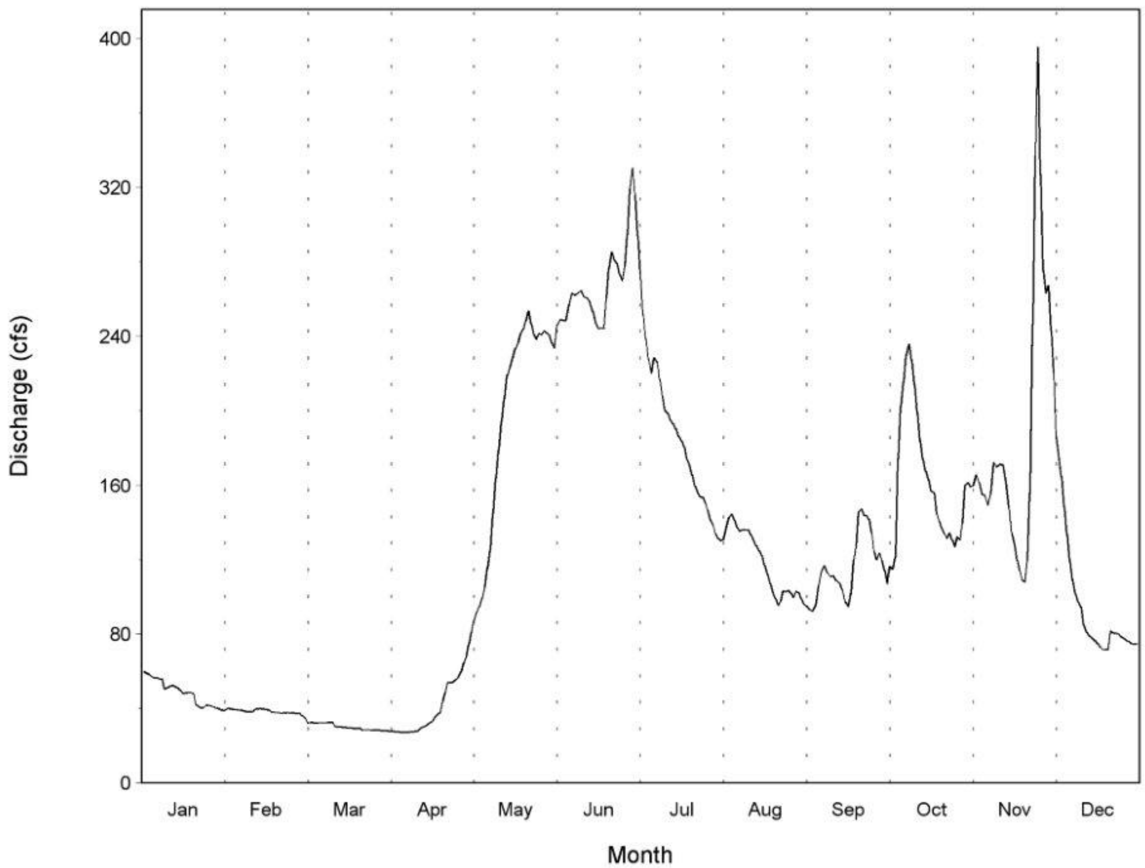

Figure 4.-Annual hydrograph of mean daily flow values (in cfs) for USGS gaging site 15264000 (Russian River Near Cooper Landing, AK), based on complete water years of record. Dates of record from May 1, 1947 to September 30, 1954.

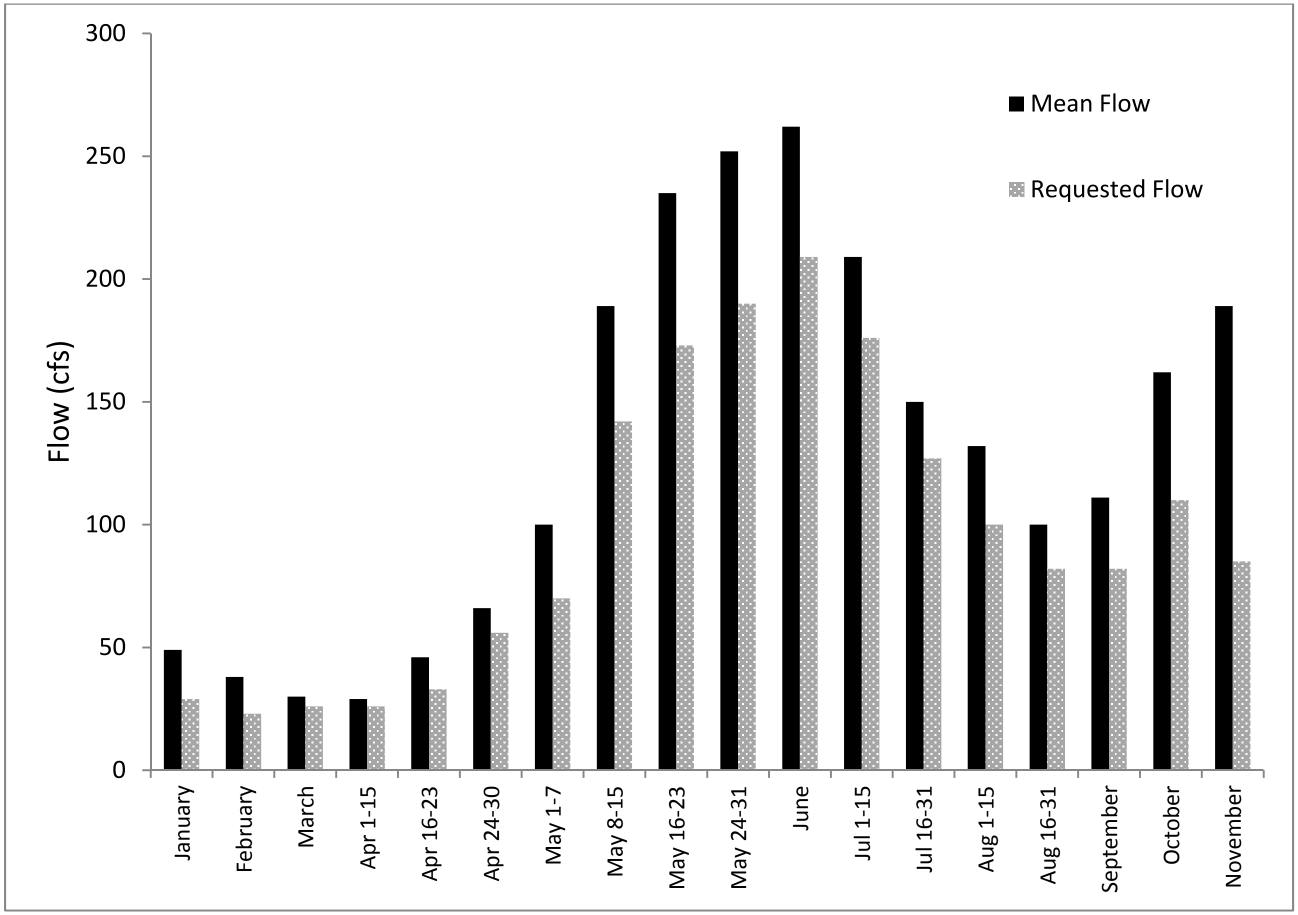

Figure 5.– Requested and mean flows for the Russian River near Cooper Landing, Alaska based on complete months of record (October 1, 1947 to September 30, 1954). Complete period of record for the gage is May 1, 1947 to September 30, 1954.