

2013 Resource Options Report Update

Appendix 8-A2

Run-of-River Report

Report Appendices: A to C

Appendix A

Hydrologic Gauge Data

List of Tables

Table A-1: WSC Gauge Data and Factors

Table A-2: WSC Station Hydrologic Data

List of Figures

Figures A-1 to A-29: Monthly Streamflow Data for Each Hydrologic Zones



Hydrologic Zone 1
 Monthly Average Streamflow (10 WSC Gauges)

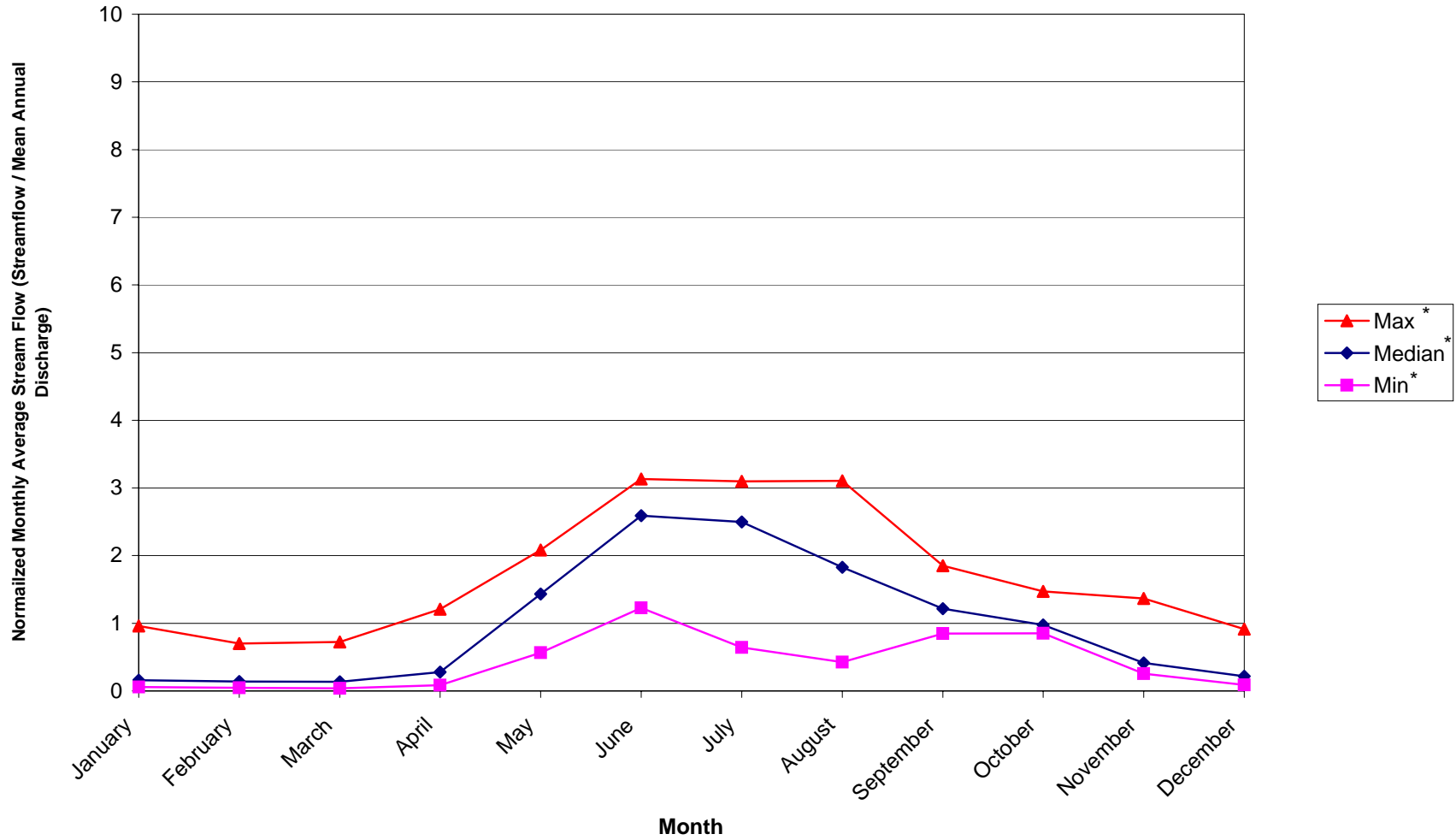
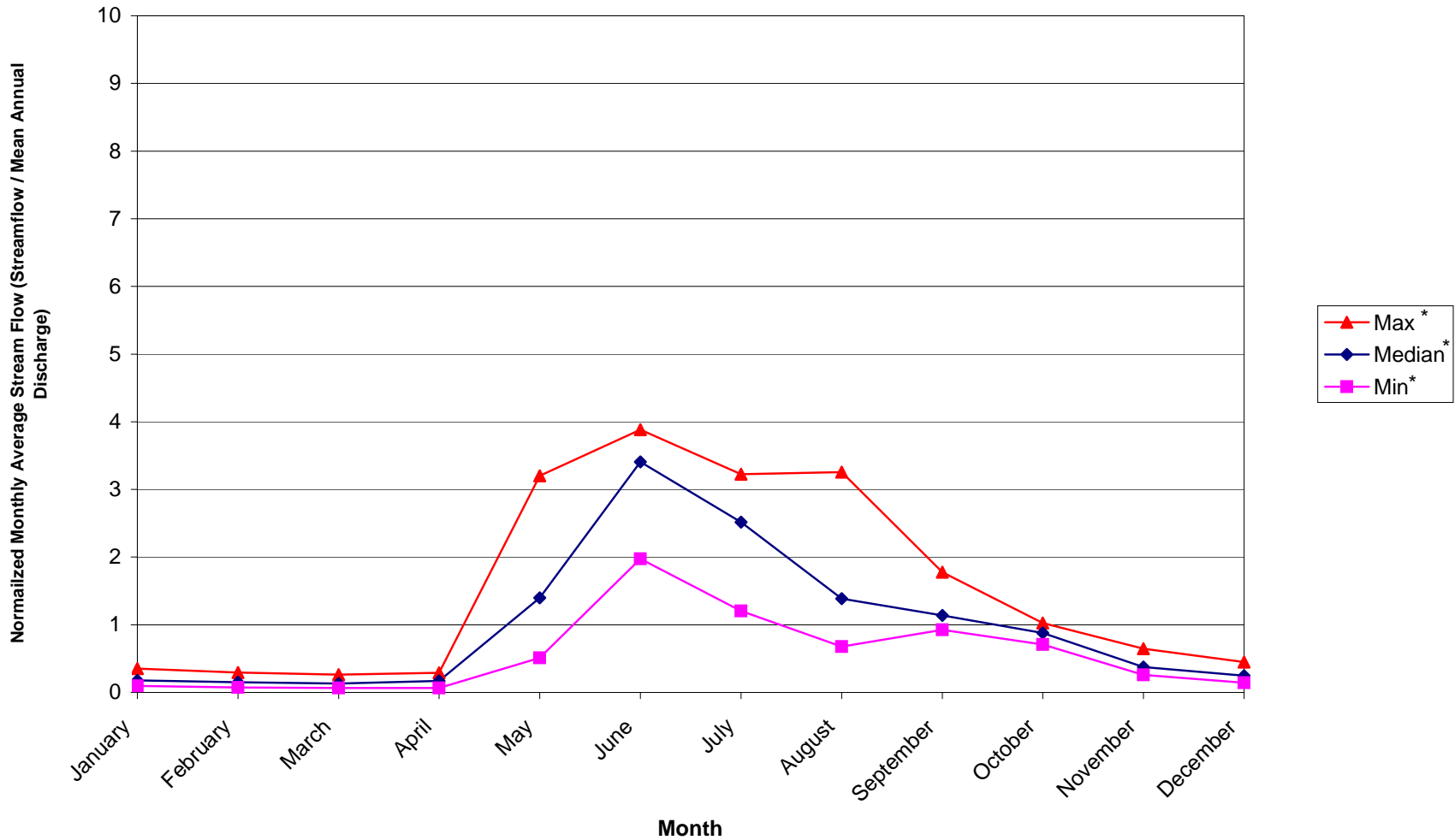


Figure A-1

* Of normalized monthly average stream flow

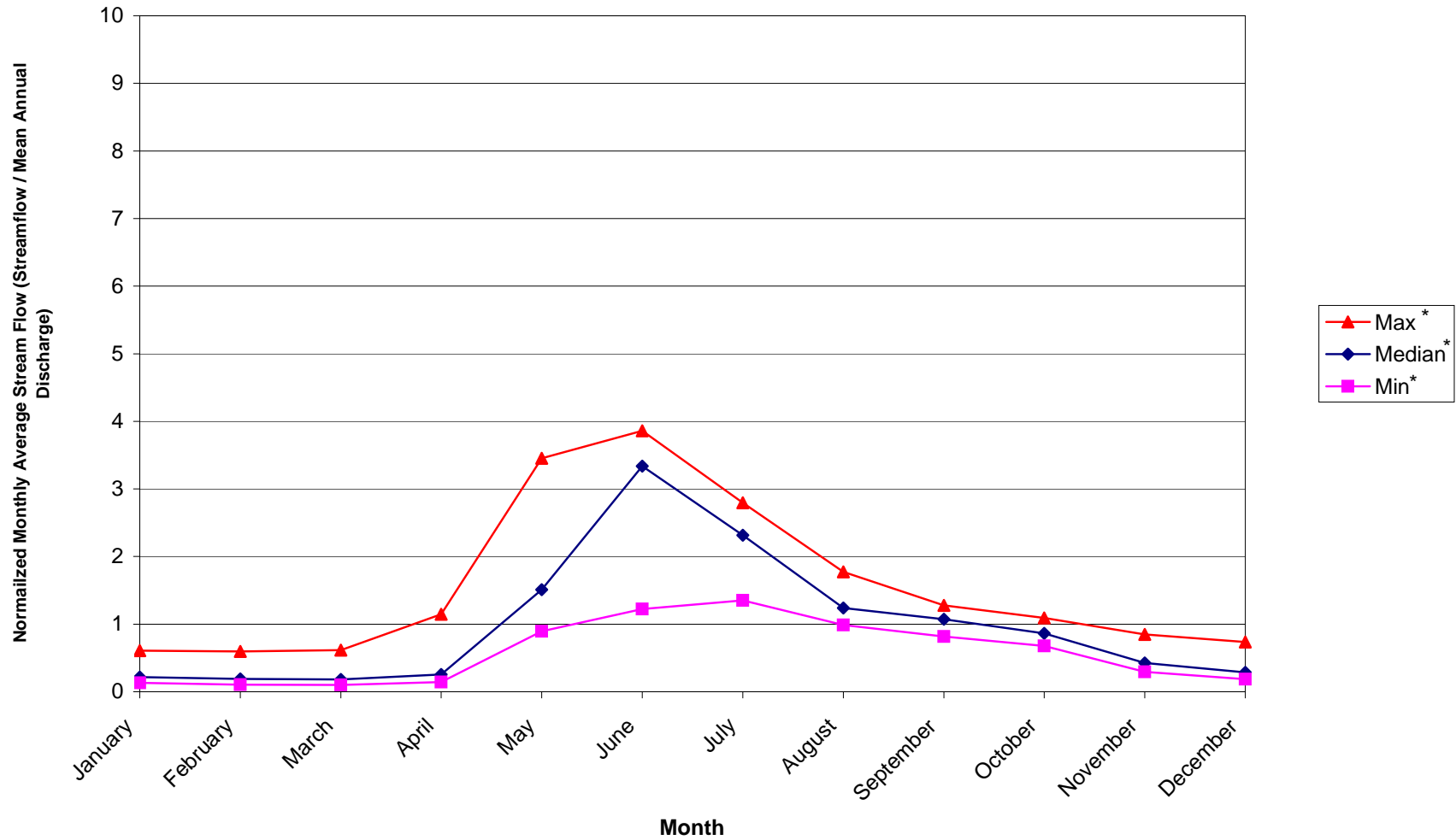
Hydrologic Zone 2
 Monthly Average Streamflow (12 WSC Gauges)



* Of normalized monthly average stream flow

Figure A-2

Hydrologic Zone 3
 Monthly Average Streamflow (24 WSC Gauges)



* Of normalized monthly average stream flow

Figure A-3

Hydrologic Zone 4
 Monthly Average Streamflow (9 WSC Gauges)

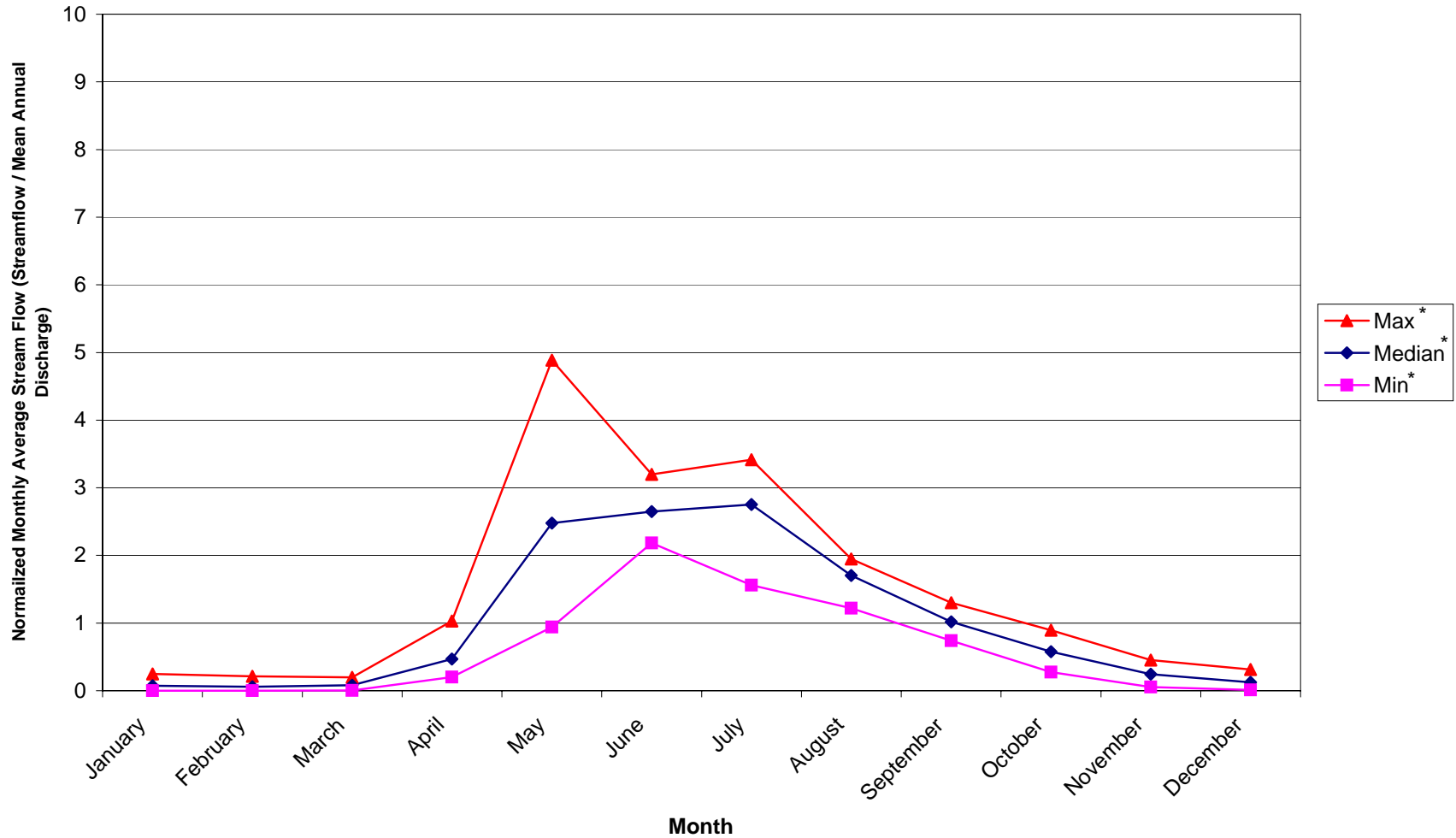
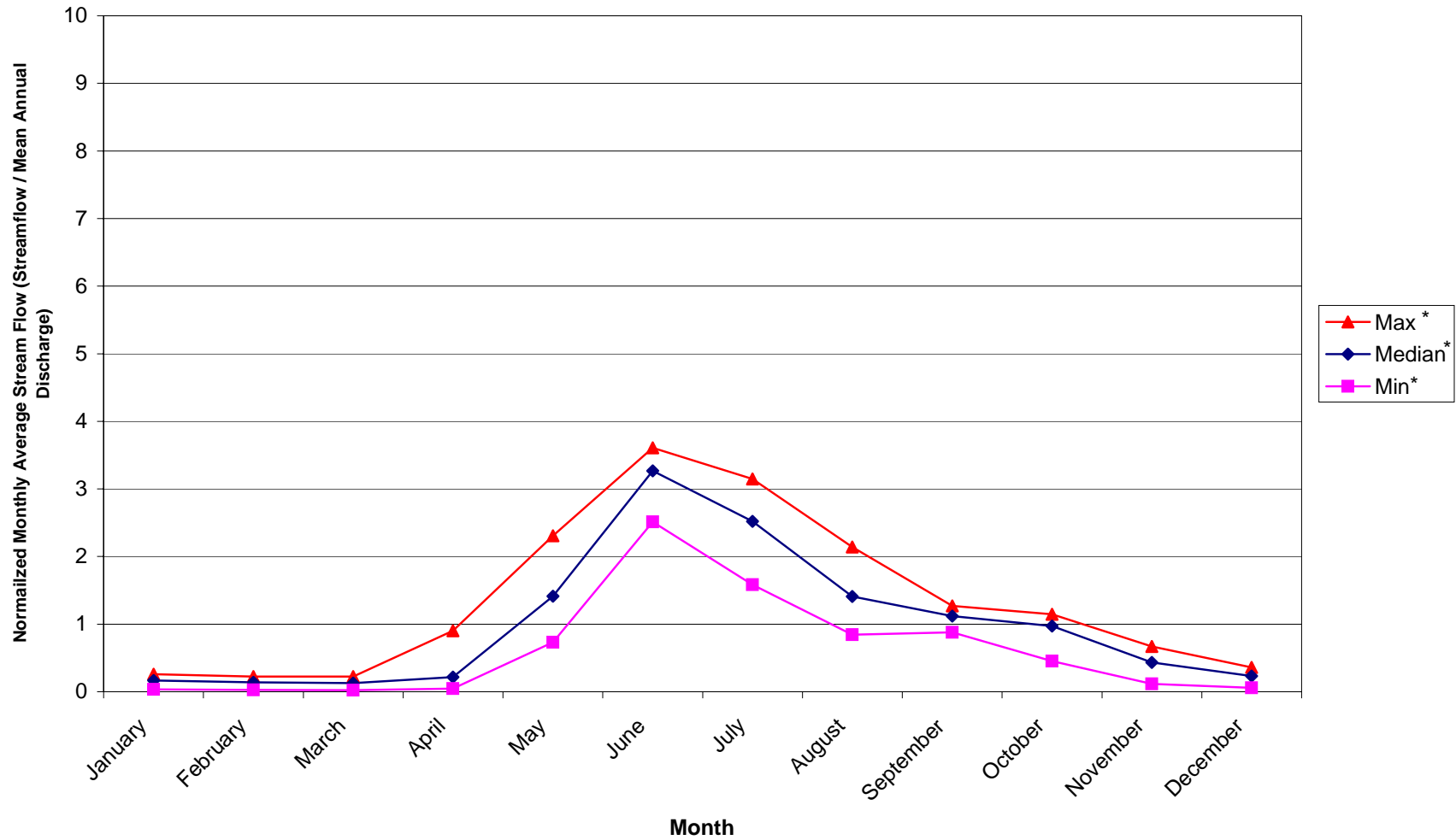


Figure A-4

* Of normalized monthly average stream flow

Hydrologic Zone 5
 Monthly Average Streamflow (6 WSC Gauges)



* Of normalized monthly average stream flow

Figure A-5

Hydrologic Zone 6
 Monthly Average Streamflow (10 WSC Gauges)

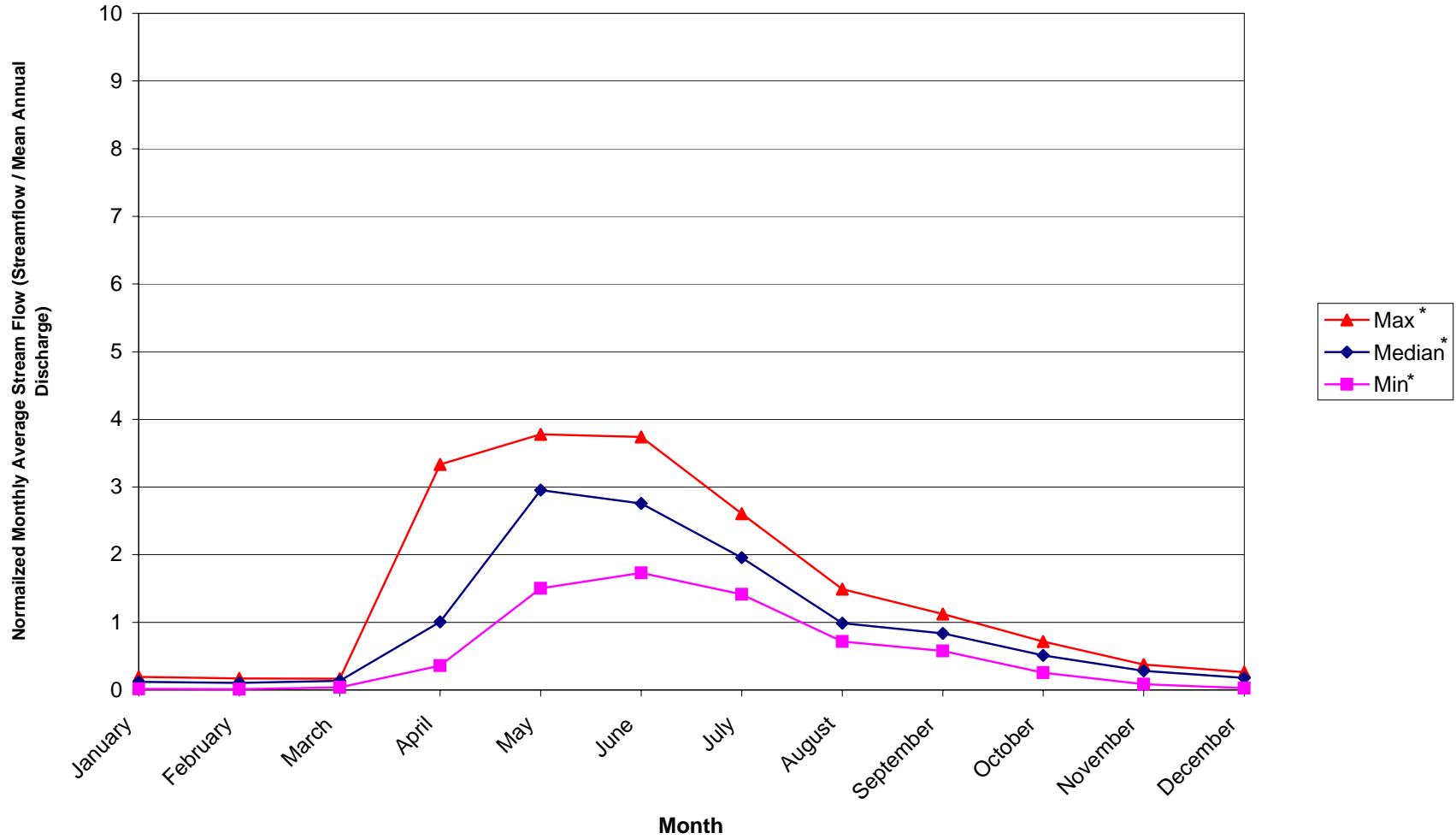


Figure A-6

* Of normalized monthly average stream flow

Hydrologic Zone 7
 Monthly Average Streamflow (8 WSC Gauges)

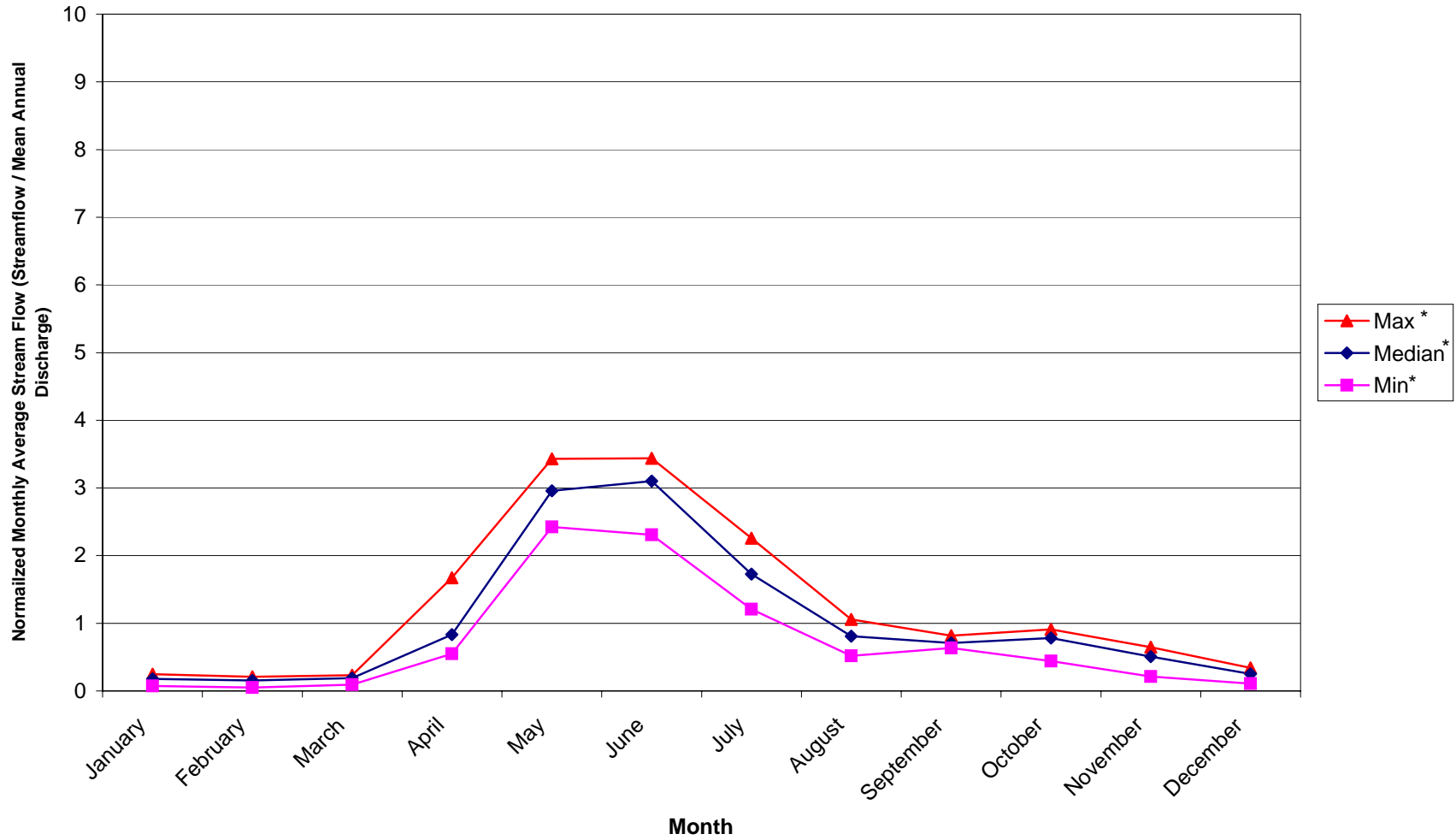


Figure A-7

* Of normalized monthly average stream flow

Hydrologic Zone 8
 Monthly Average Streamflow (30 WSC Gauges)

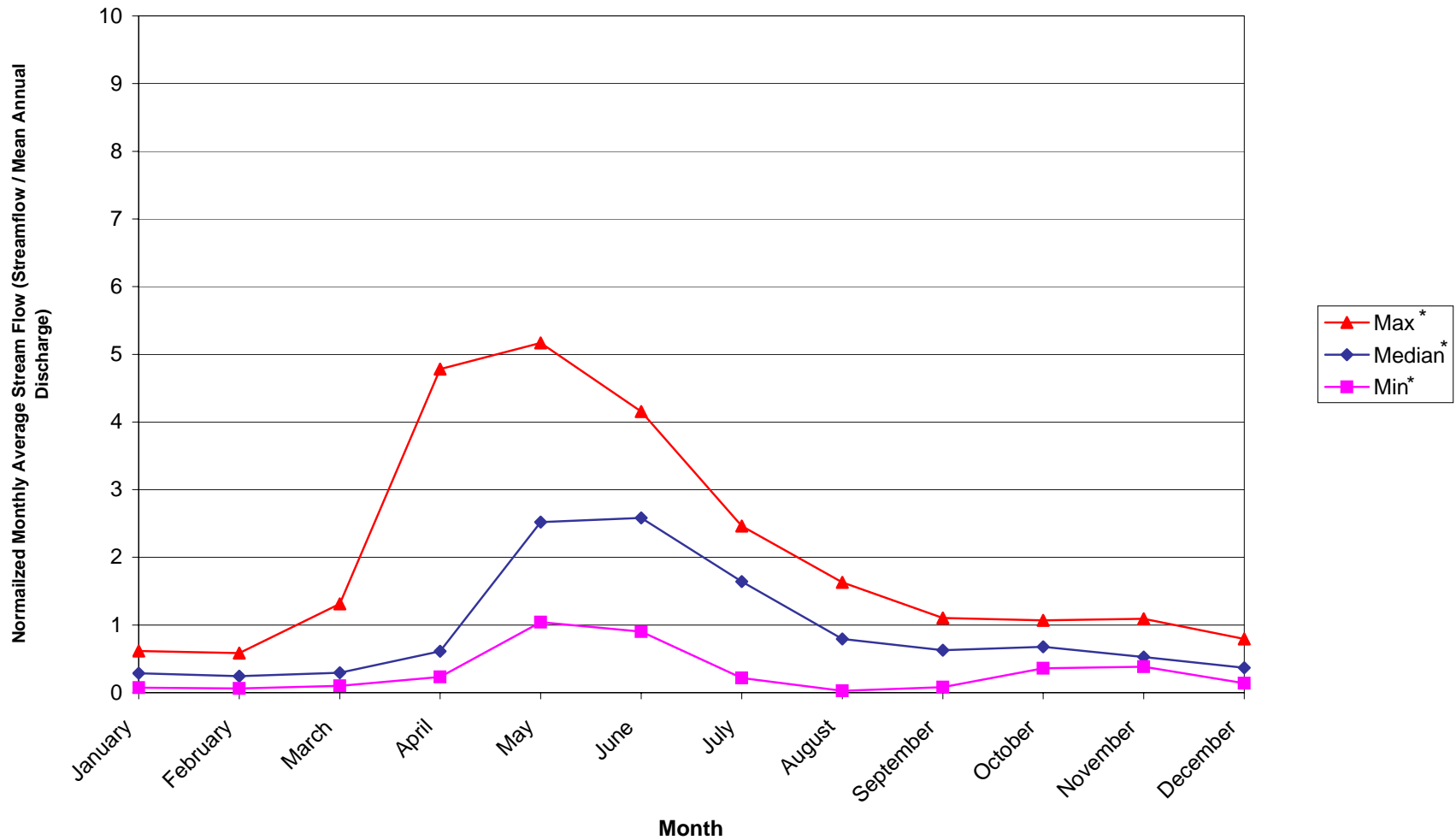


Figure A-8

* Of normalized monthly average stream flow

Hydrologic Zone 9
 Monthly Average Streamflow (6 WSC Gauges)

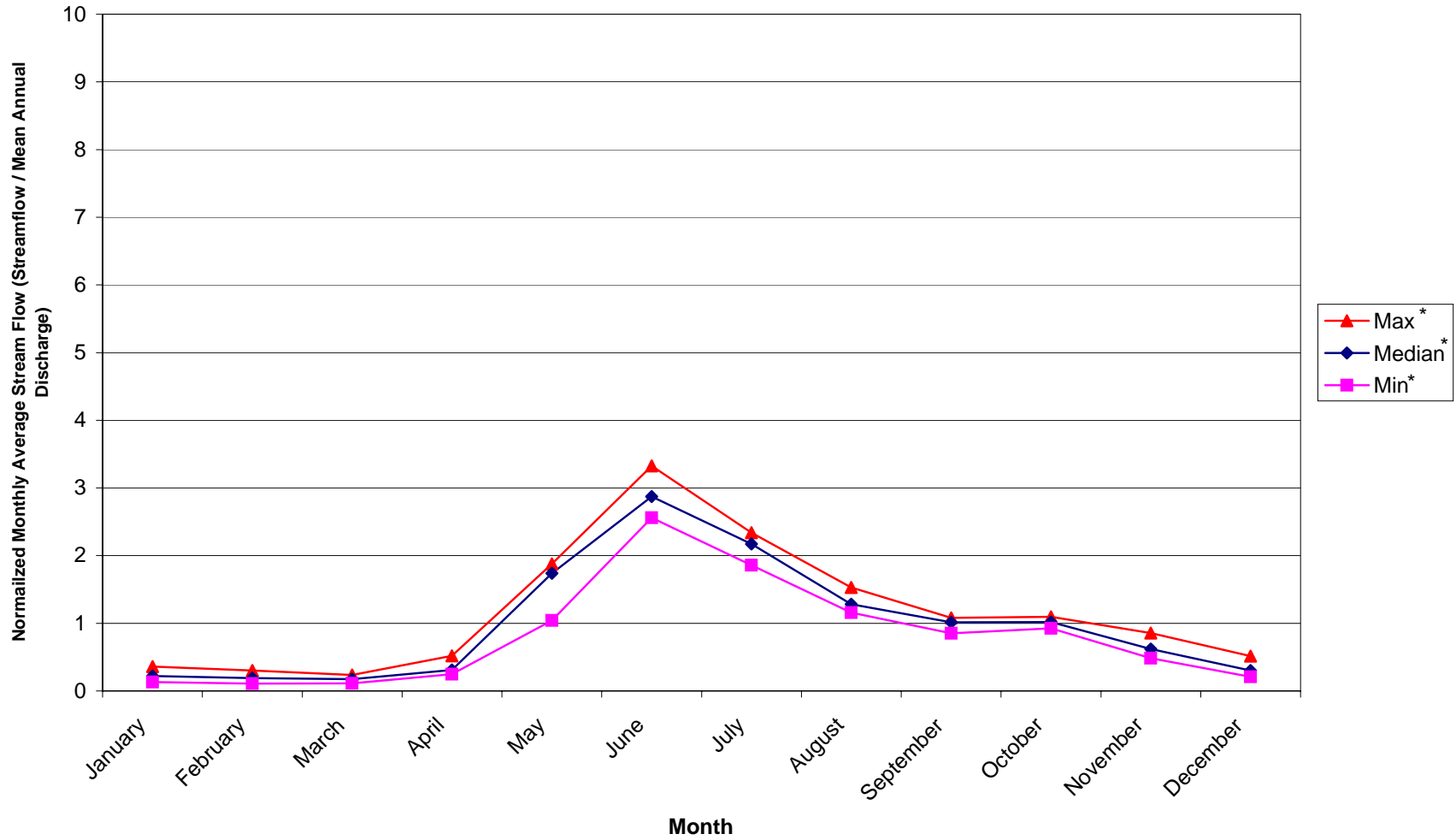


Figure A-9

* Of normalized monthly average stream flow

Hydrologic Zone 10
 Monthly Average Stream Flows (10 WSC Gauges)

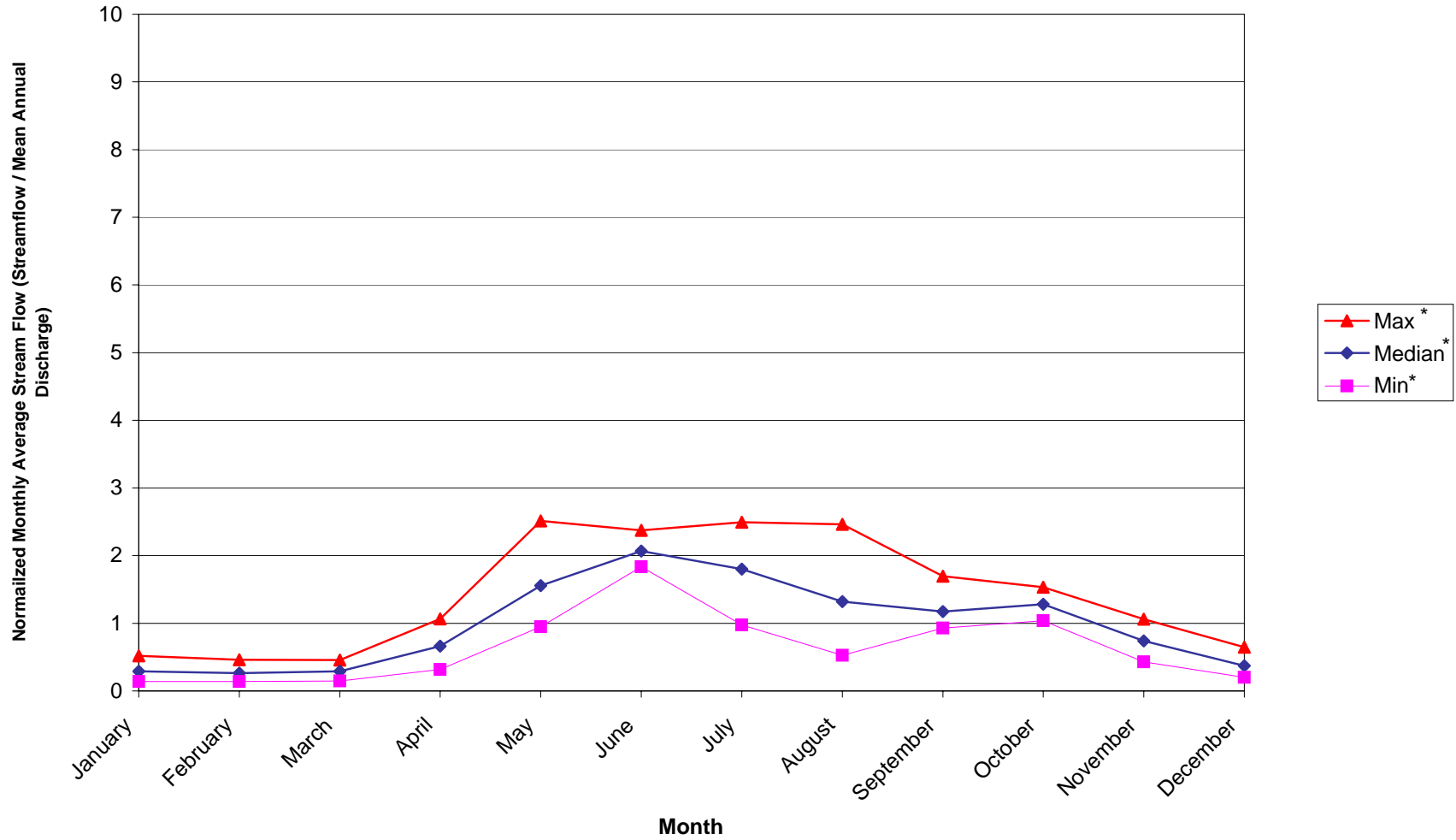


Figure A-10

* Of normalized monthly average stream flow

Hydrologic Zone 11
 Monthly Average Stream Flows (2 WSC Gauges)

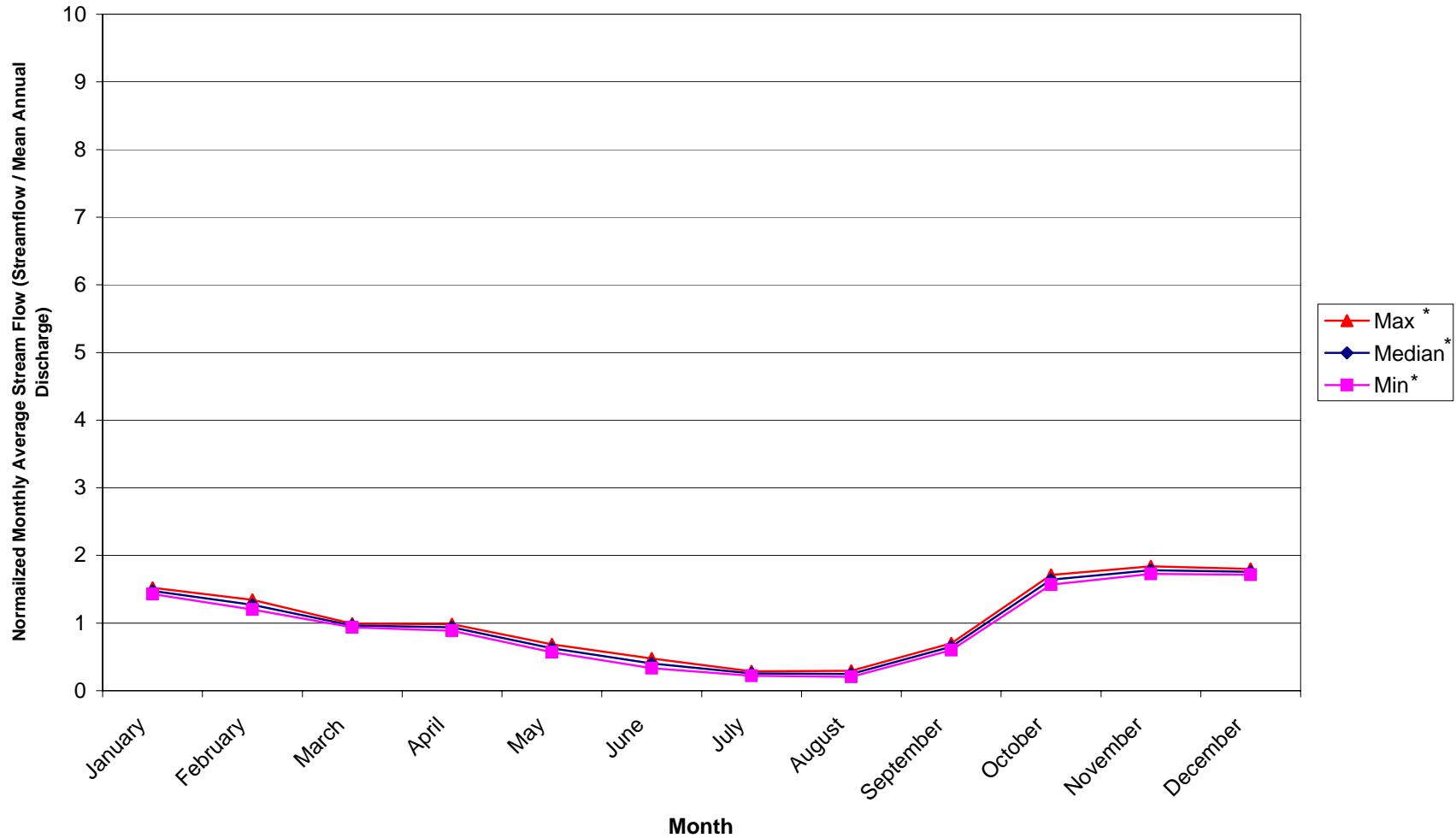


Figure A-11

* Of normalized monthly average stream flow

Hydrologic Zone 12
 Monthly Average Stream Flows (5 WSC Gauges)

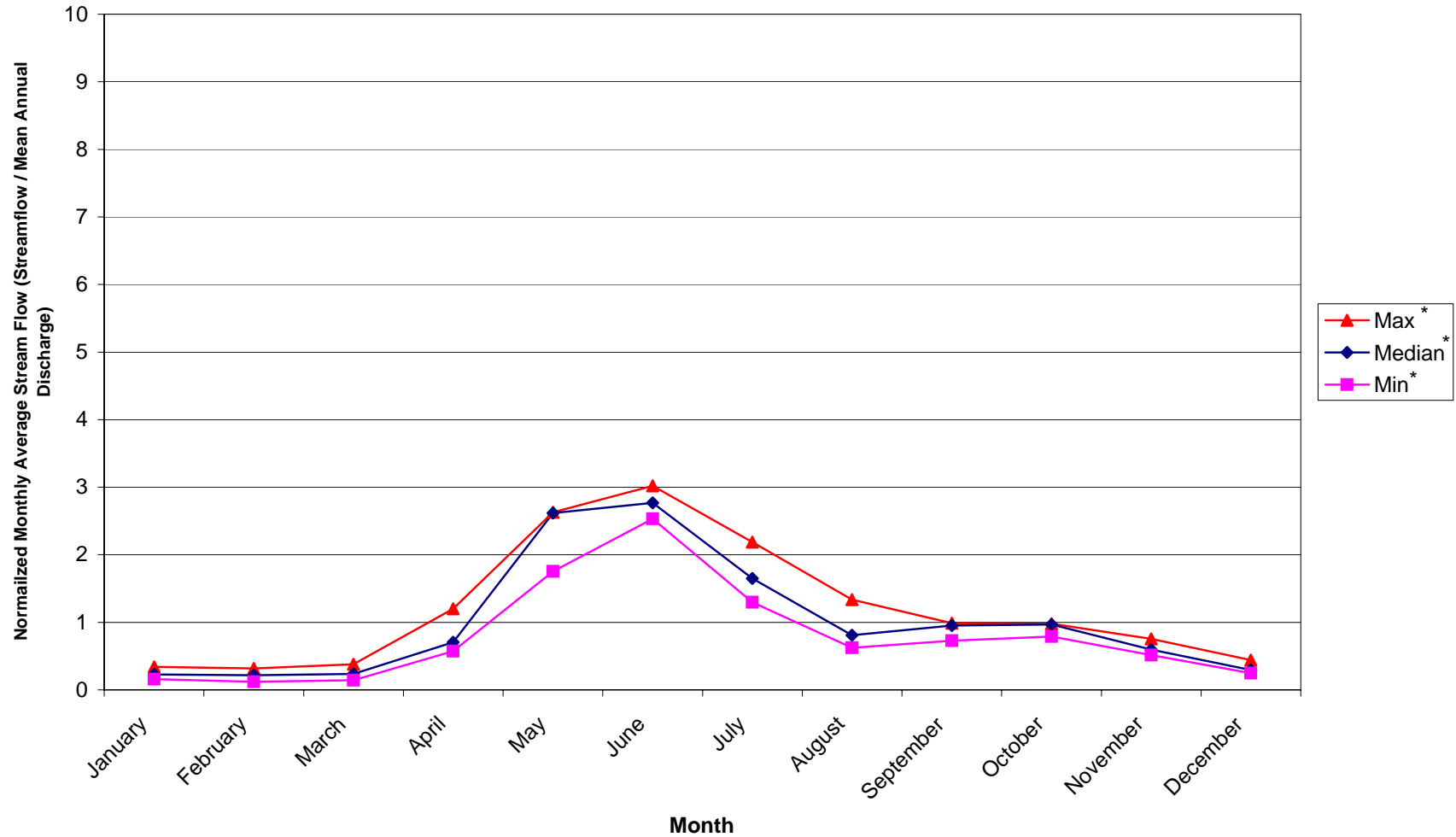


Figure A-12

* Of normalized monthly average stream flow

Hydrologic Zone 13
 Monthly Average Stream Flows (7 WSC Gauges)

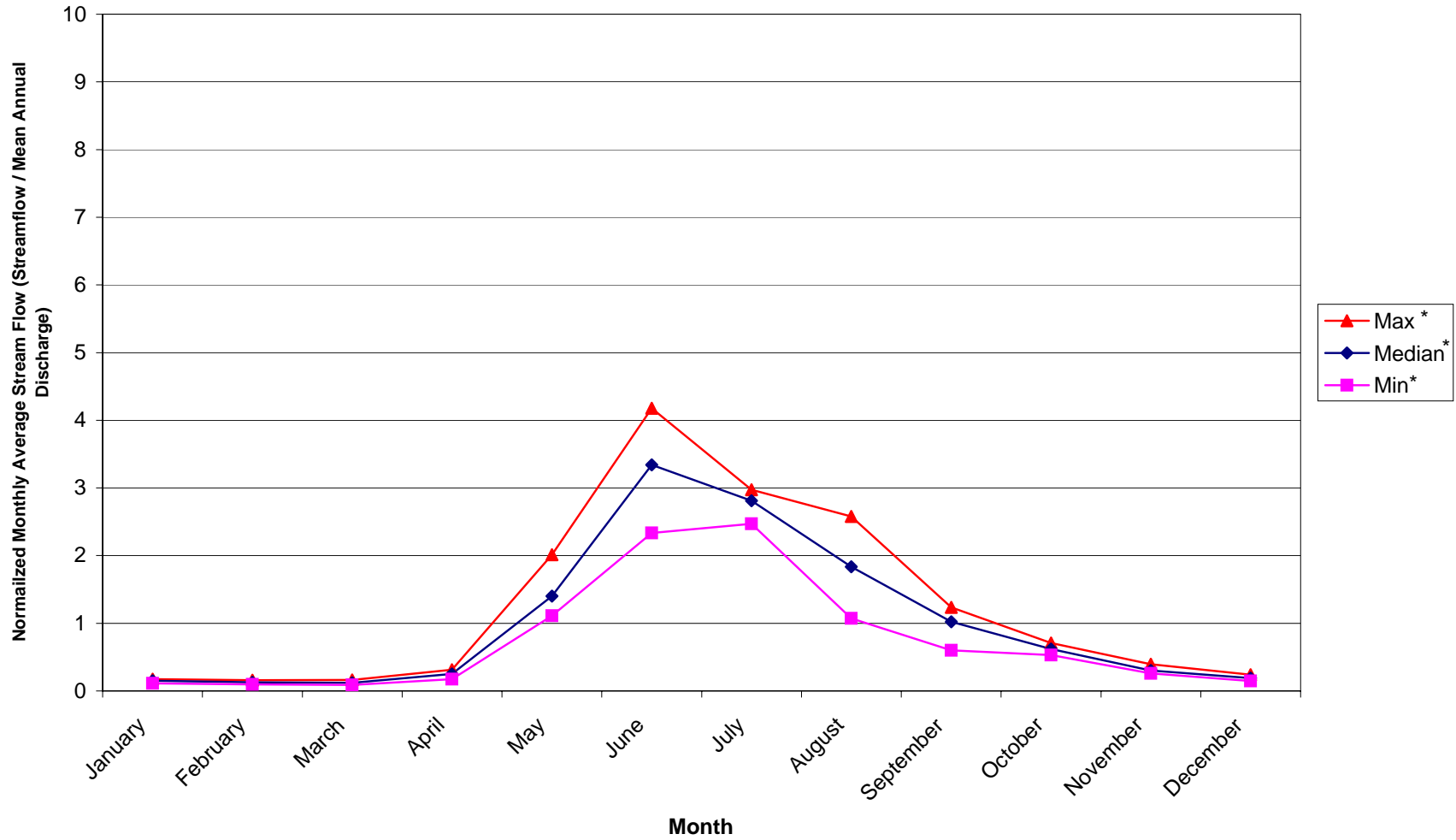


Figure A-13

* Of normalized monthly average stream flow

Hydrologic Zone 14
 Monthly Average Stream Flows (19 WSC Gauges)

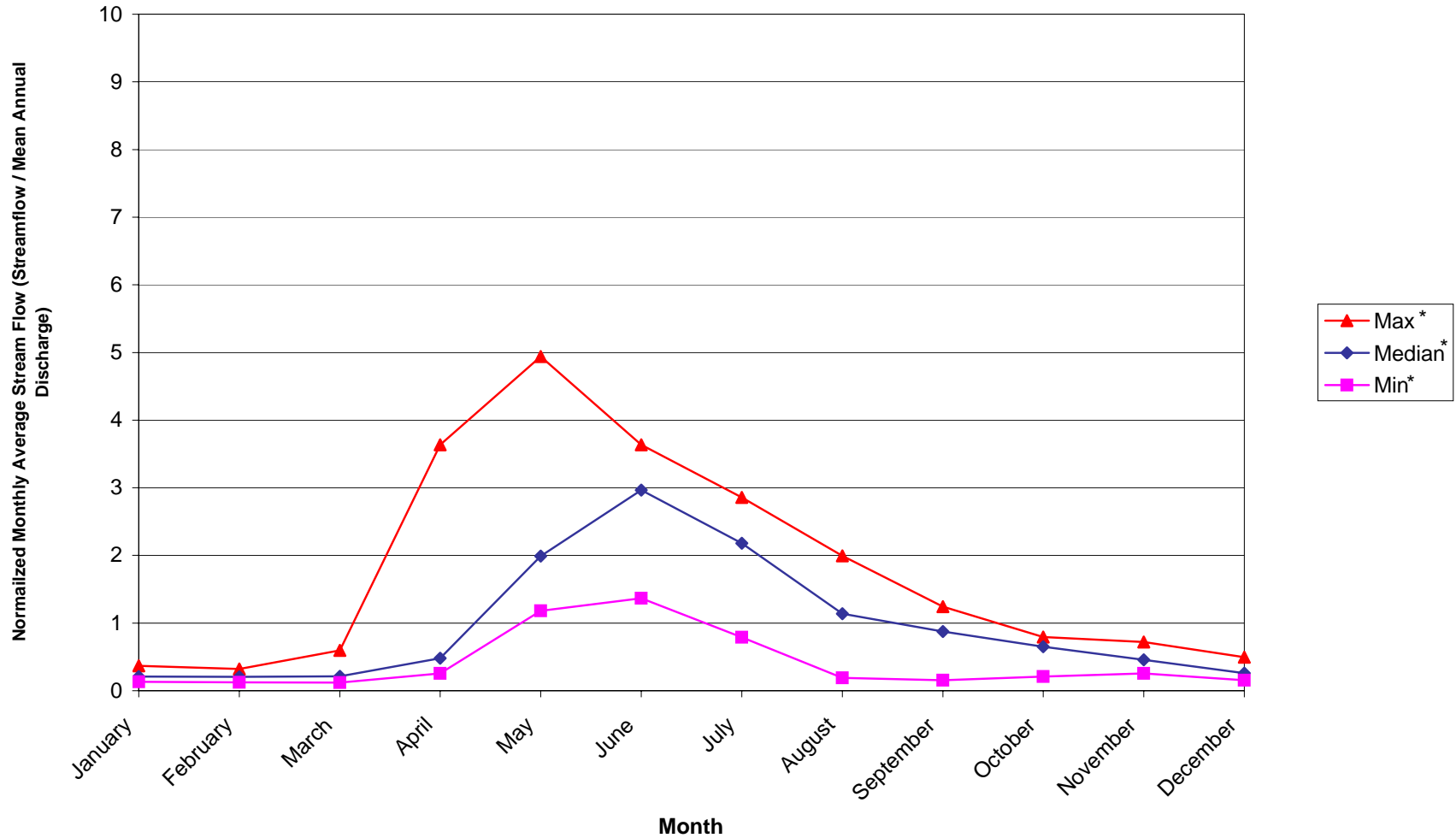


Figure A-14

* Of normalized monthly average stream flow

Hydrologic Zone 15
 Monthly Average Stream Flows (35 WSC Gauges)

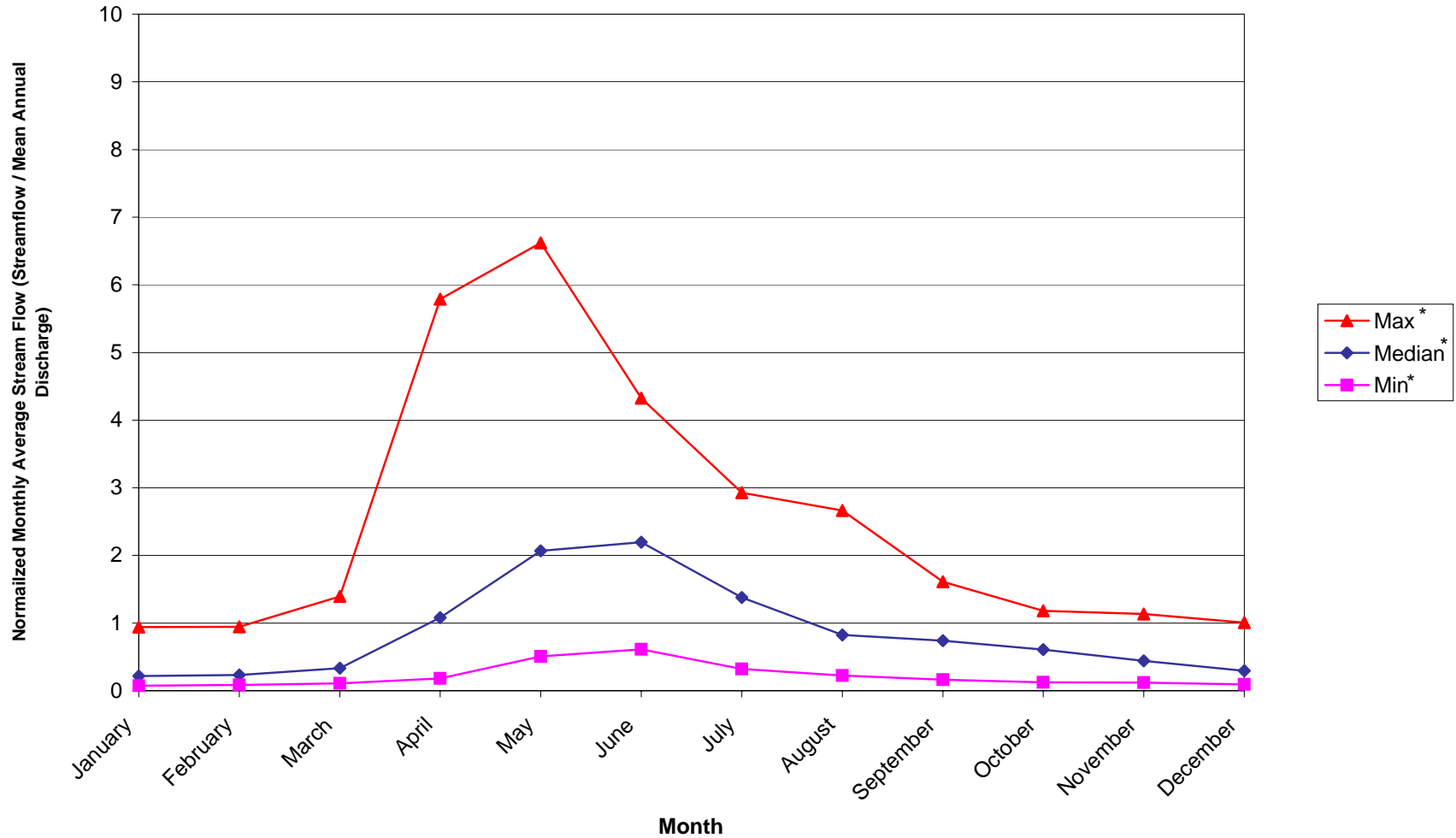


Figure A-15

* Of normalized monthly average stream flow

Hydrologic Zone 16
 Monthly Average Stream Flows (11 WSC Gauges)

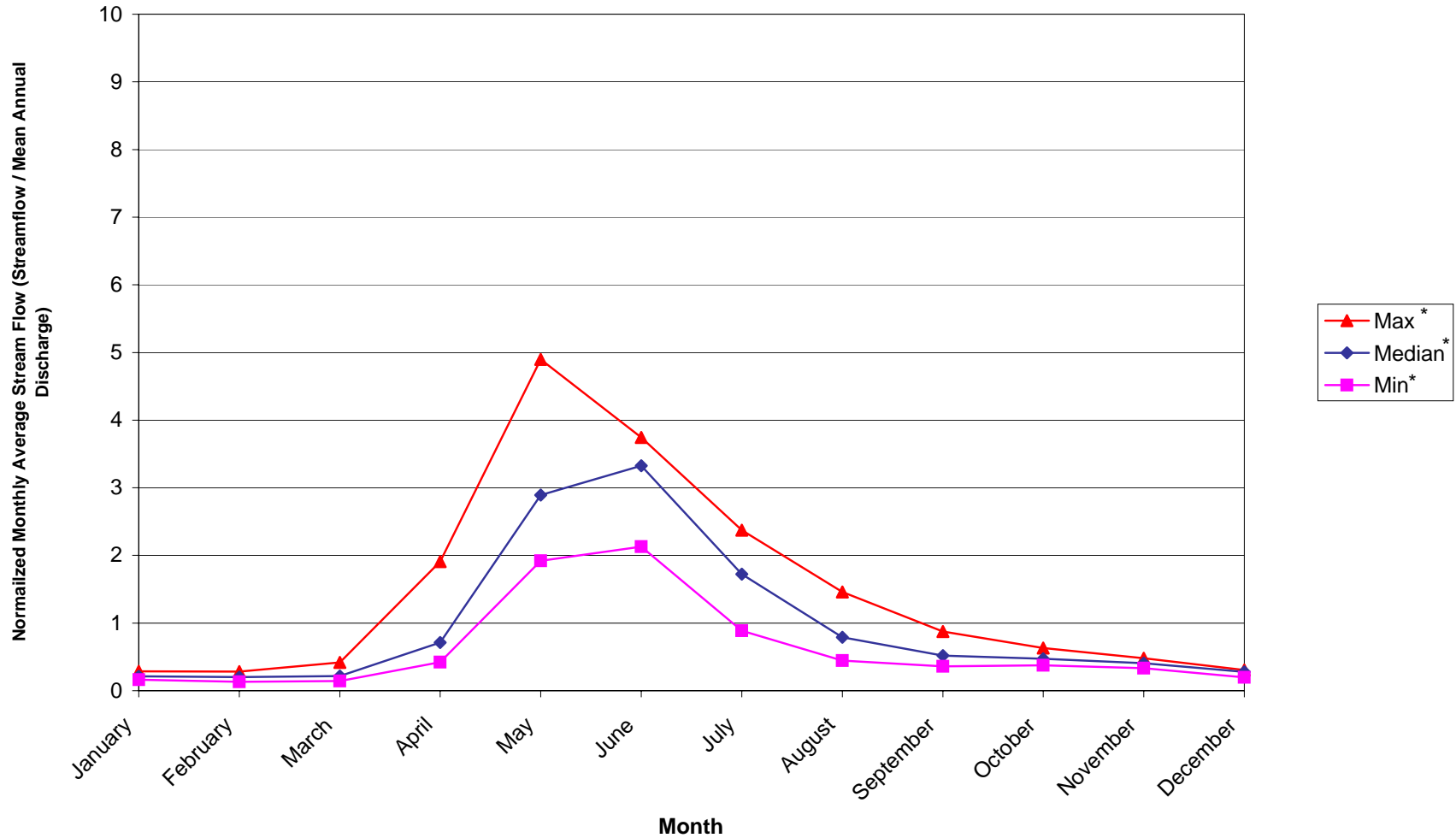


Figure A-16

* Of normalized monthly average stream flow

Hydrologic Zone 17
 Monthly Average Stream Flows (8 WSC Gauges)

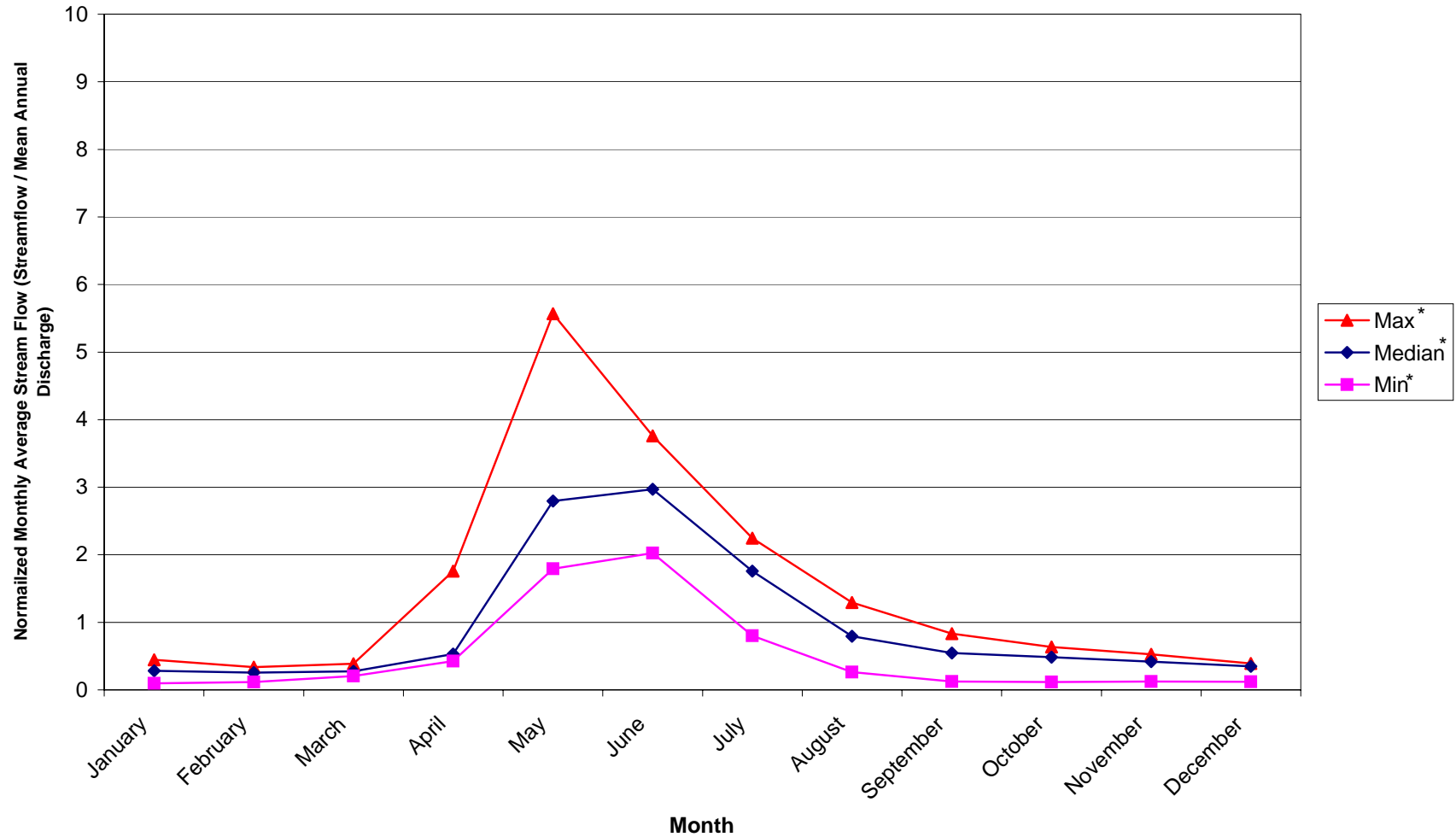


Figure A-17

* Of normalized monthly average stream flow

Hydrologic Zone 18
 Monthly Average Stream Flows (18 WSC Gauges)

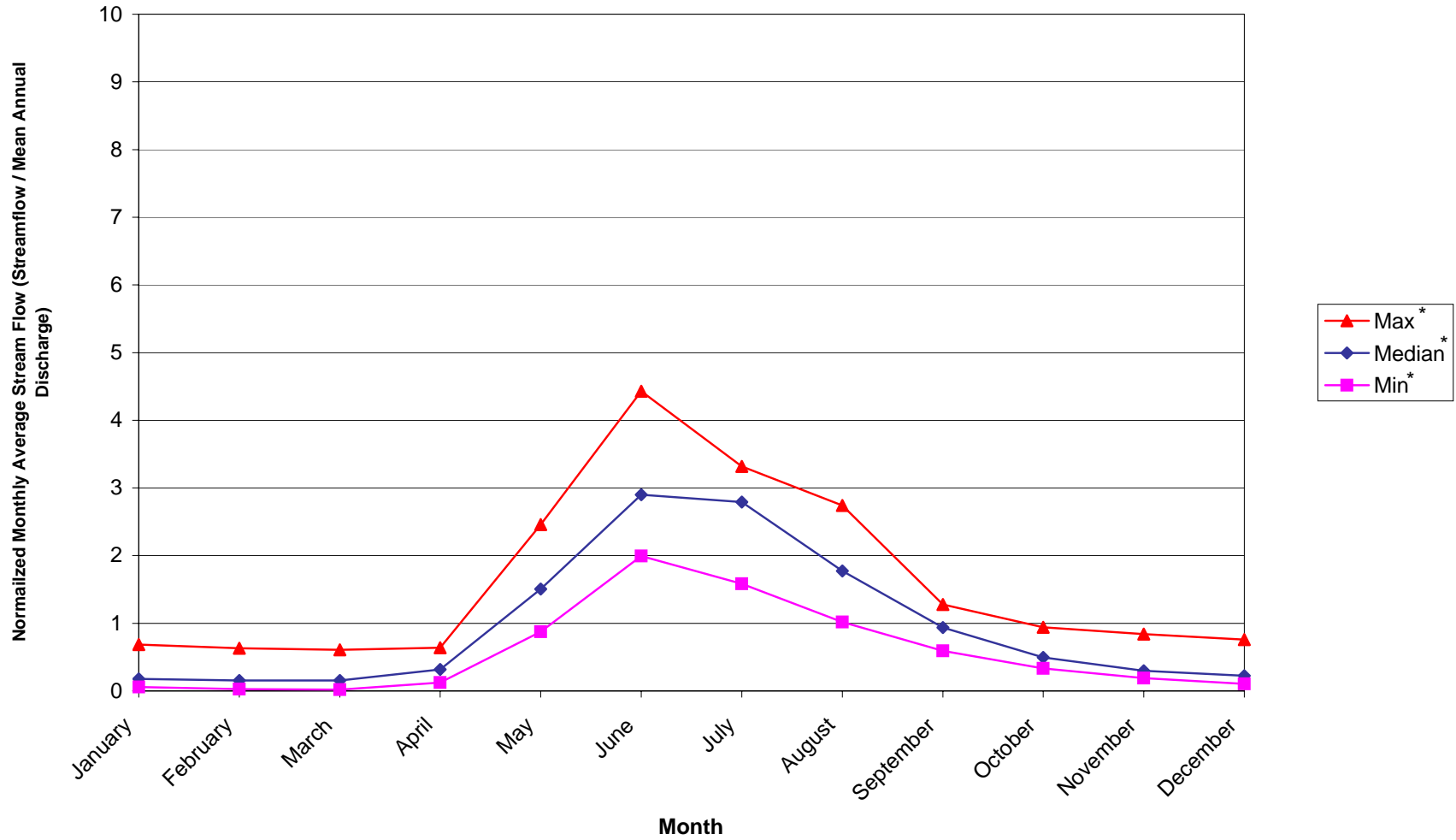


Figure A-18

* Of normalized monthly average stream flow

Hydrologic Zone 19
 Monthly Average Stream Flows (8 WSC Gauges)

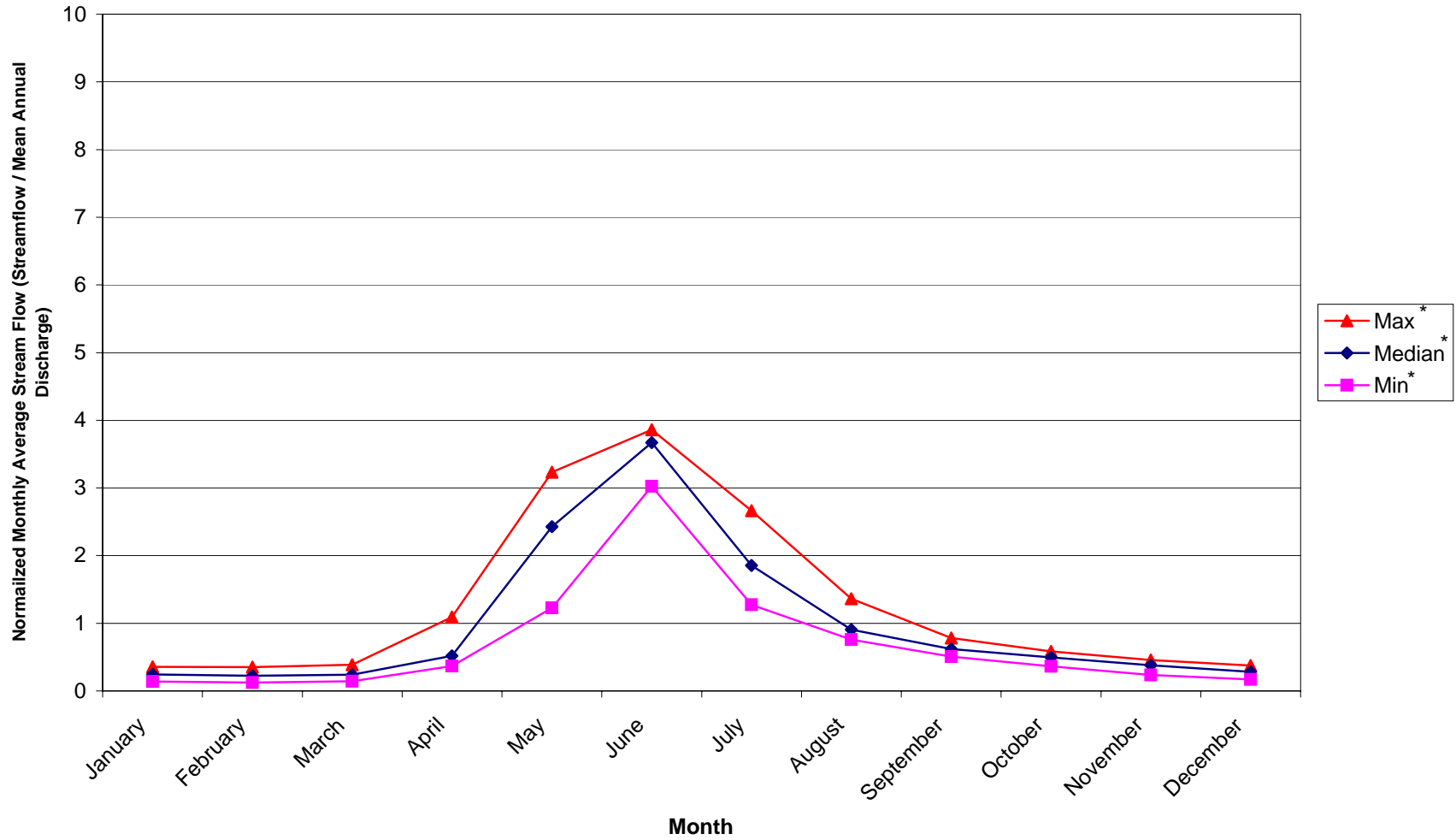


Figure A-19

* Of normalized monthly average stream flow

Hydrologic Zone 20
 Monthly Average Stream Flows (20 WSC Gauges)

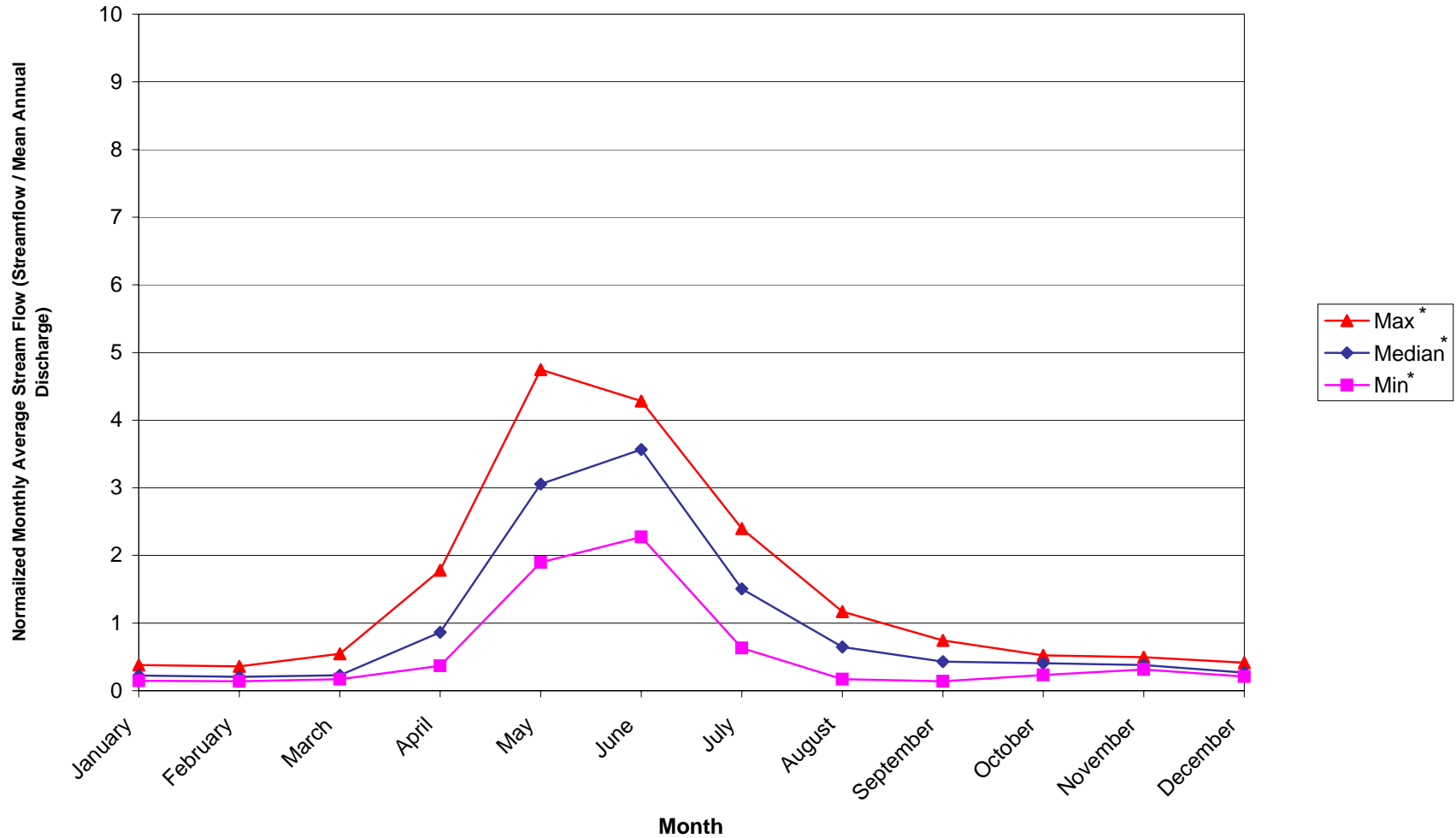


Figure A-20

* Of normalized monthly average stream flow

Hydrologic Zone 21
 Monthly Average Stream Flows (16 WSC Gauges)

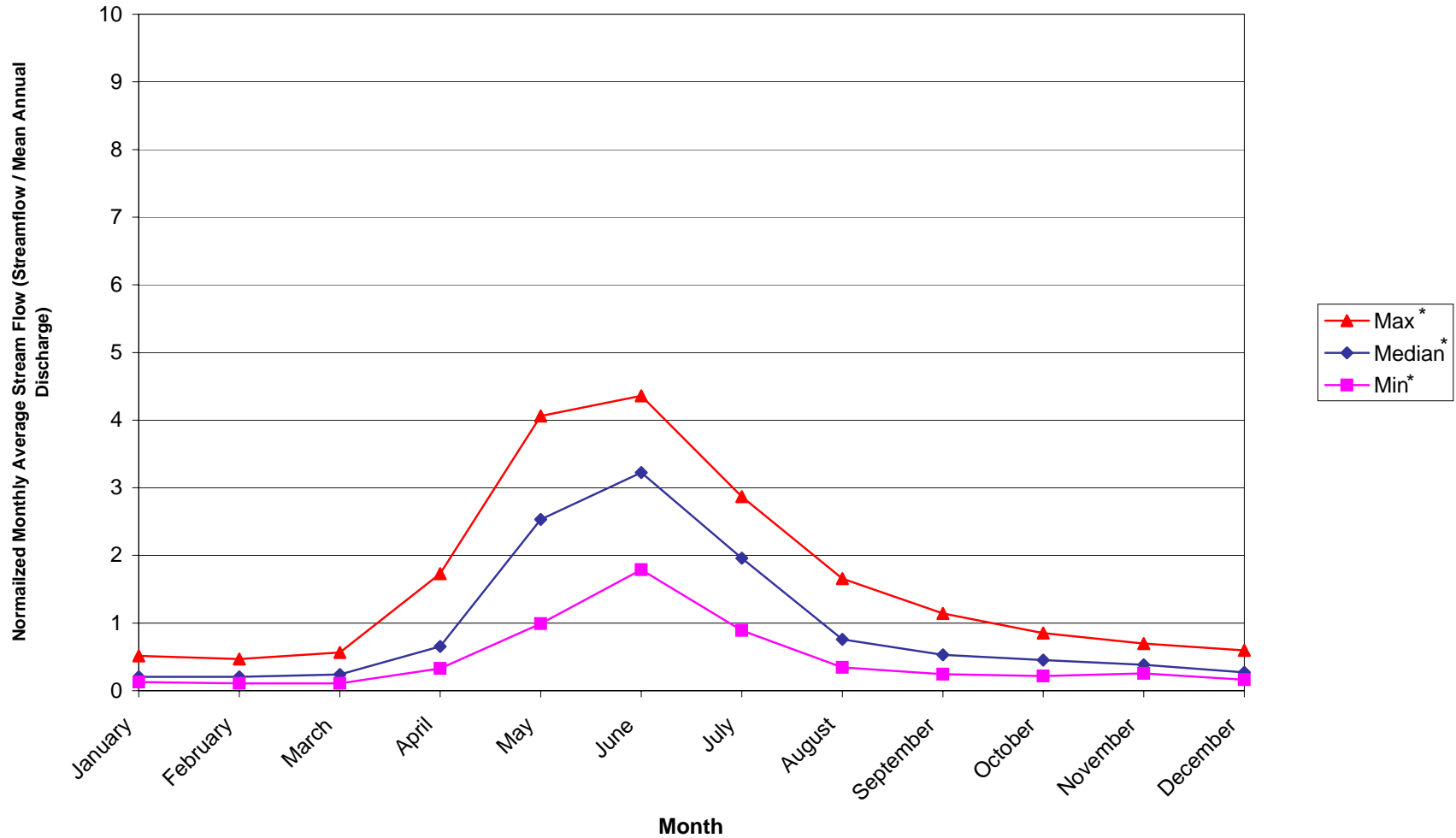


Figure A-21

* Of normalized monthly average stream flow

Hydrologic Zone 22
 Monthly Average Stream Flows (22 WSC Gauges)

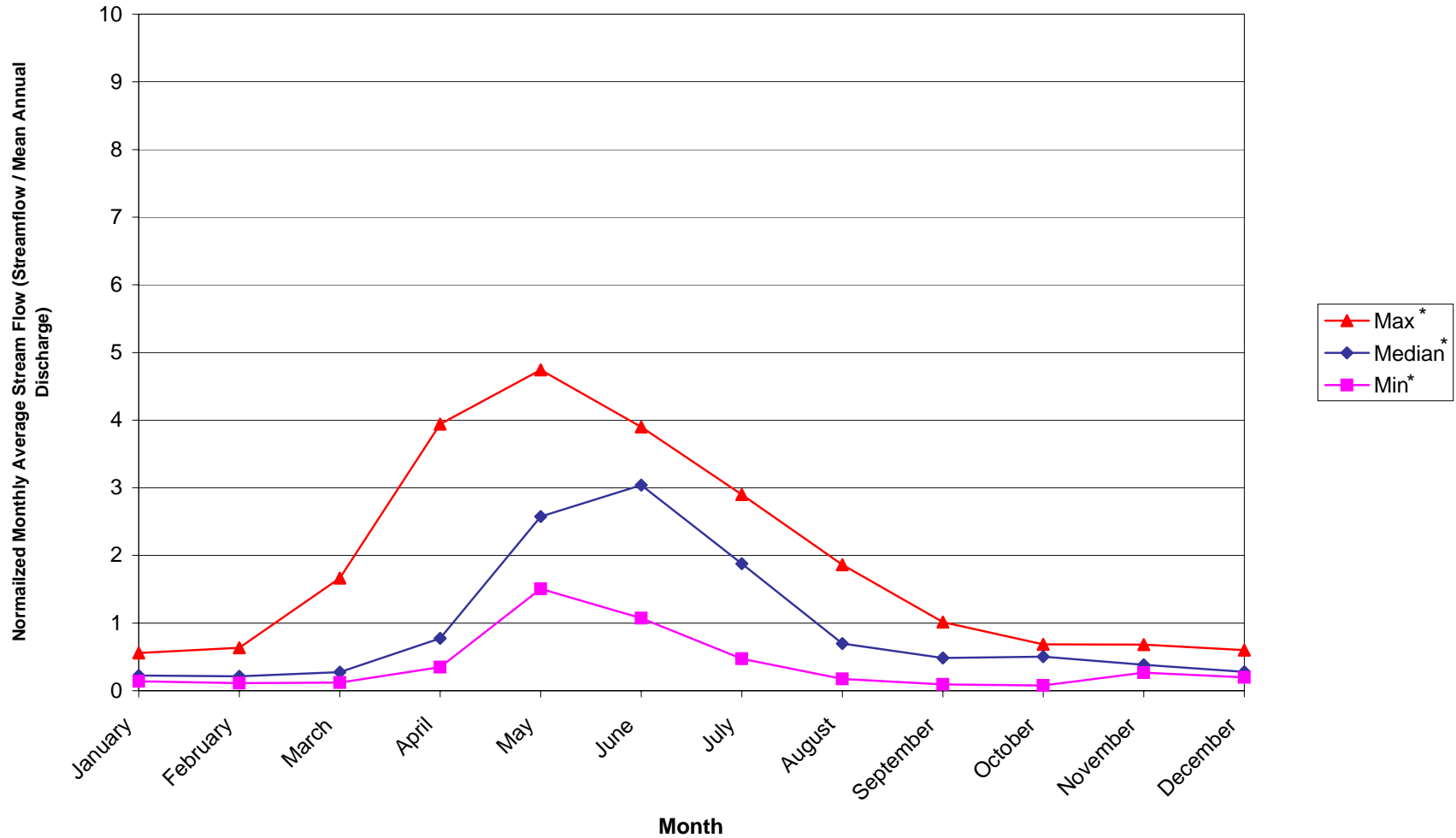


Figure A-22

* Of normalized monthly average stream flow

Hydrologic Zone 23
 Monthly Average Stream Flows (12 WSC Gauges)

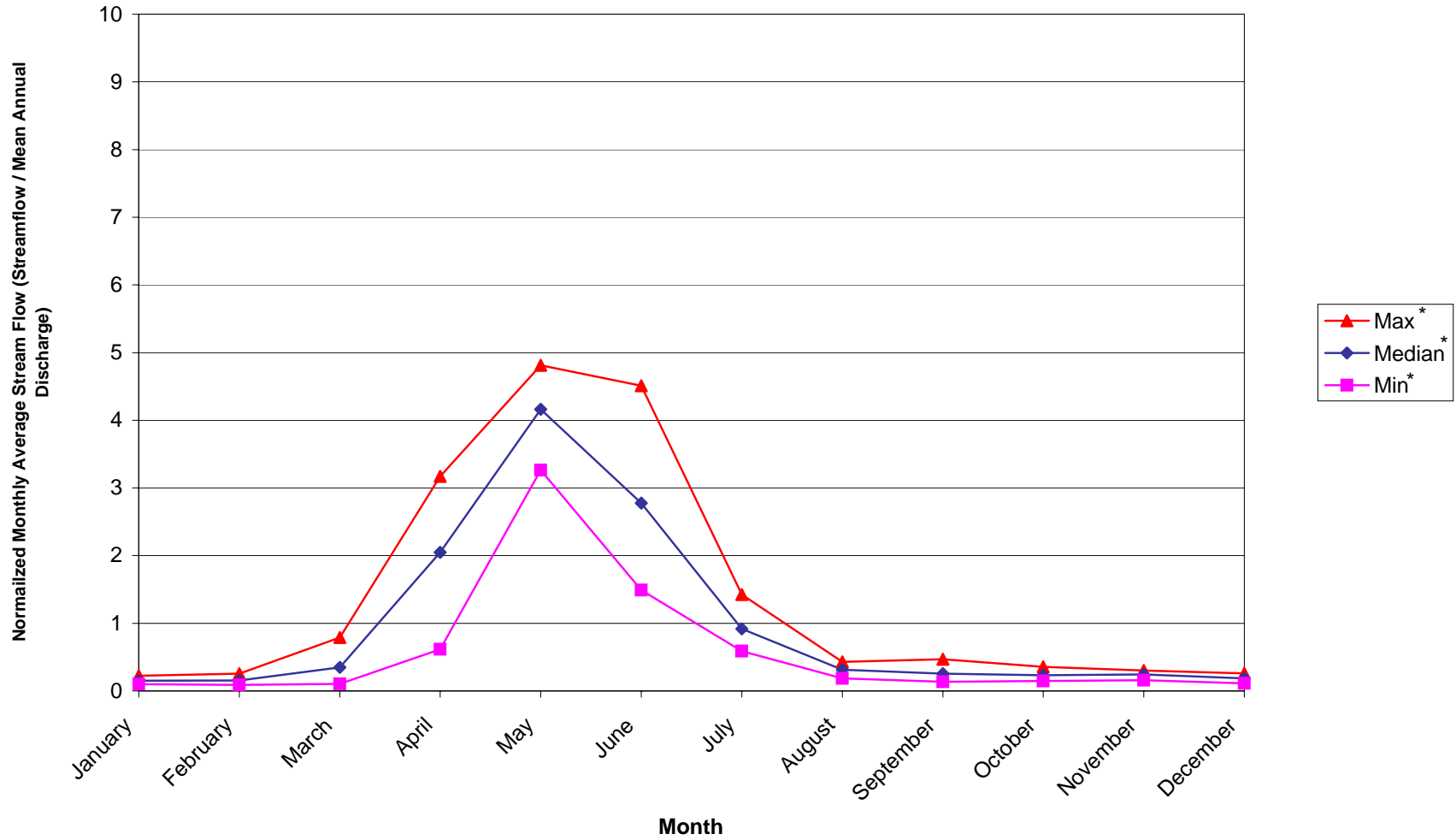


Figure A-23

* Of normalized monthly average stream flow

Hydrologic Zone 24
 Monthly Average Stream Flows (24 WSC Gauges)

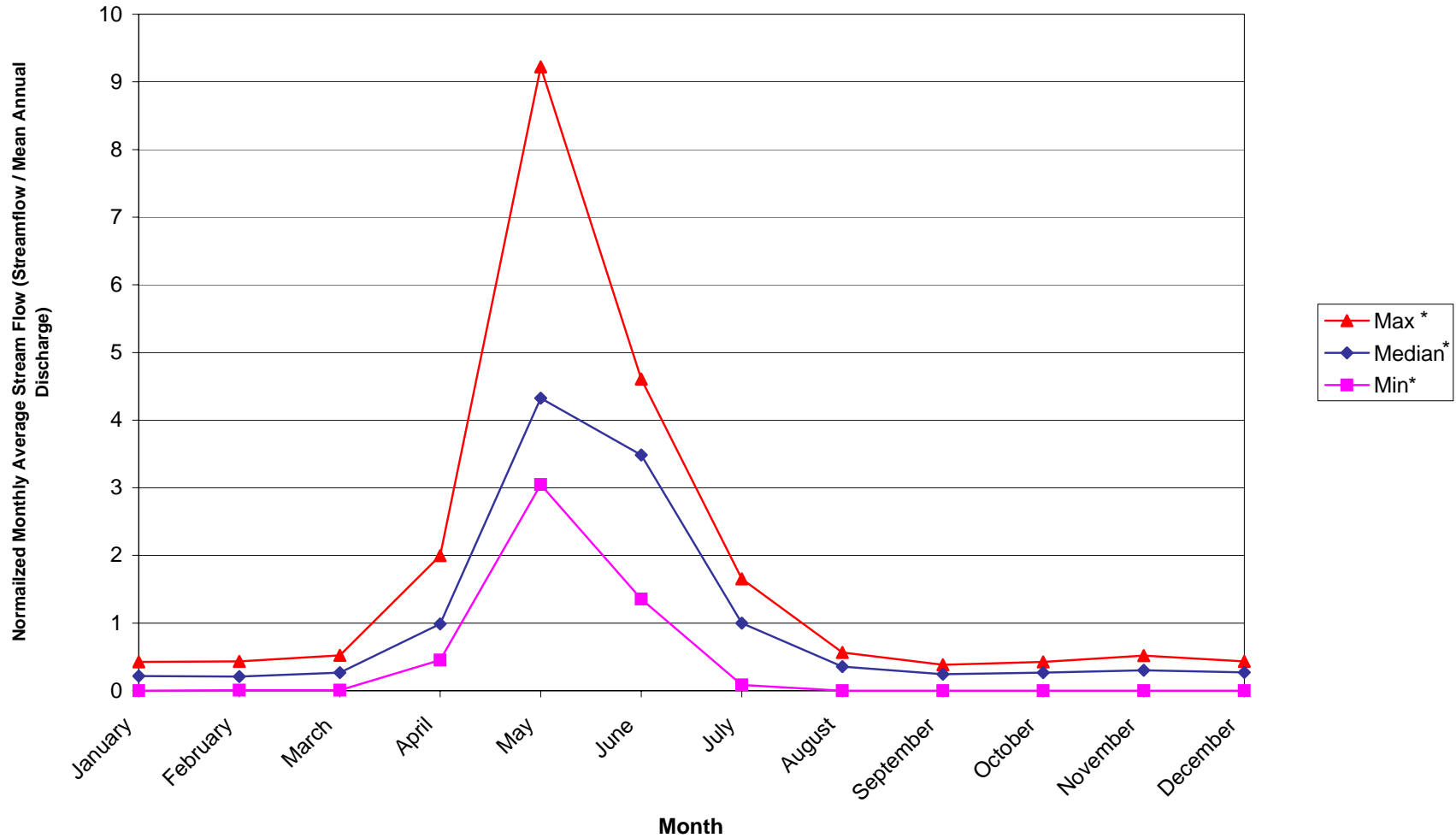


Figure A-24

* Of normalized monthly average stream flow

Hydrologic Zone 25
 Monthly Average Stream Flows (11 WSC Gauges)

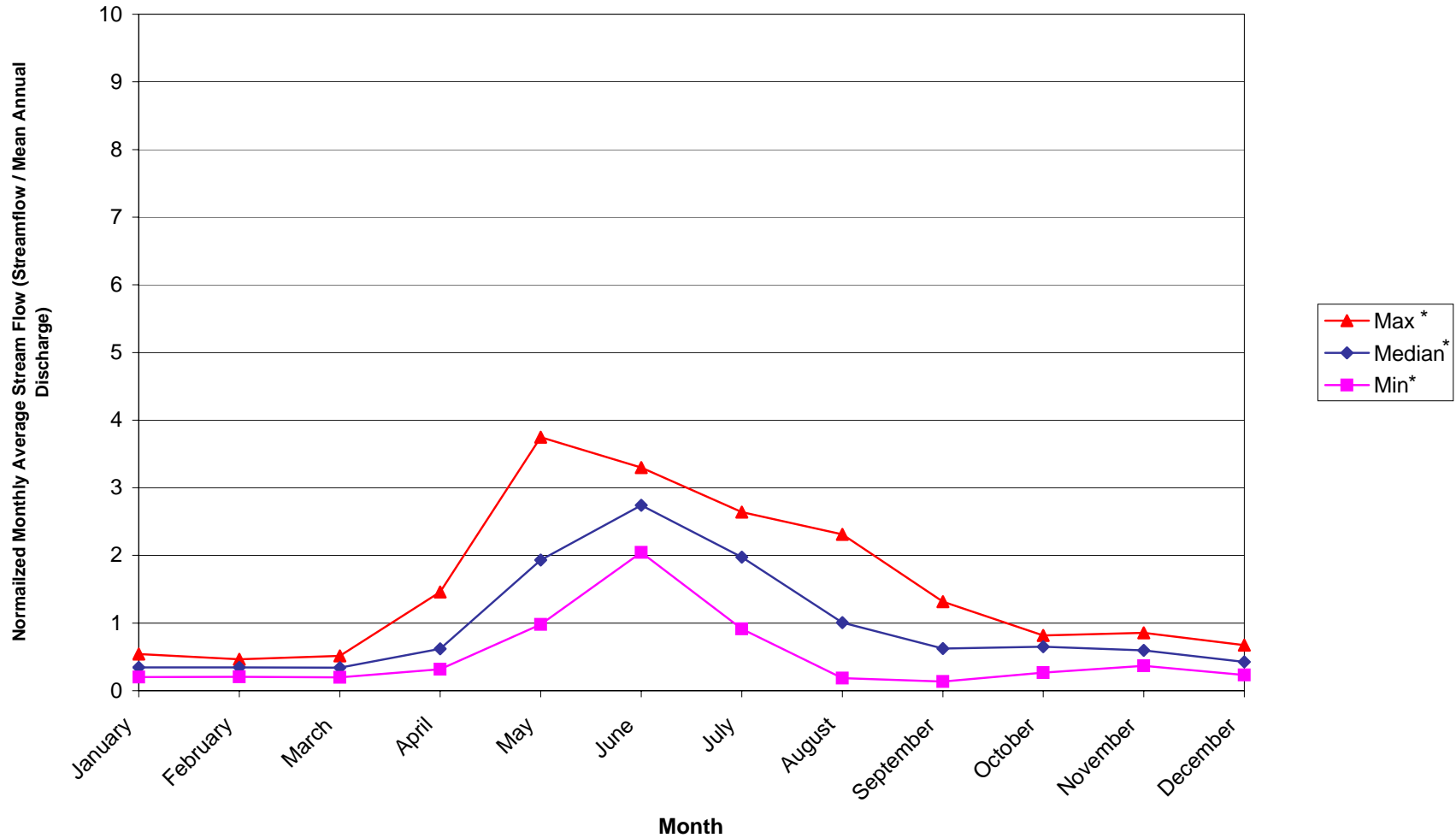


Figure A-25

* Of normalized monthly average stream flow

Hydrologic Zone 26
 Monthly Average Stream Flows (25 WSC Gauges)

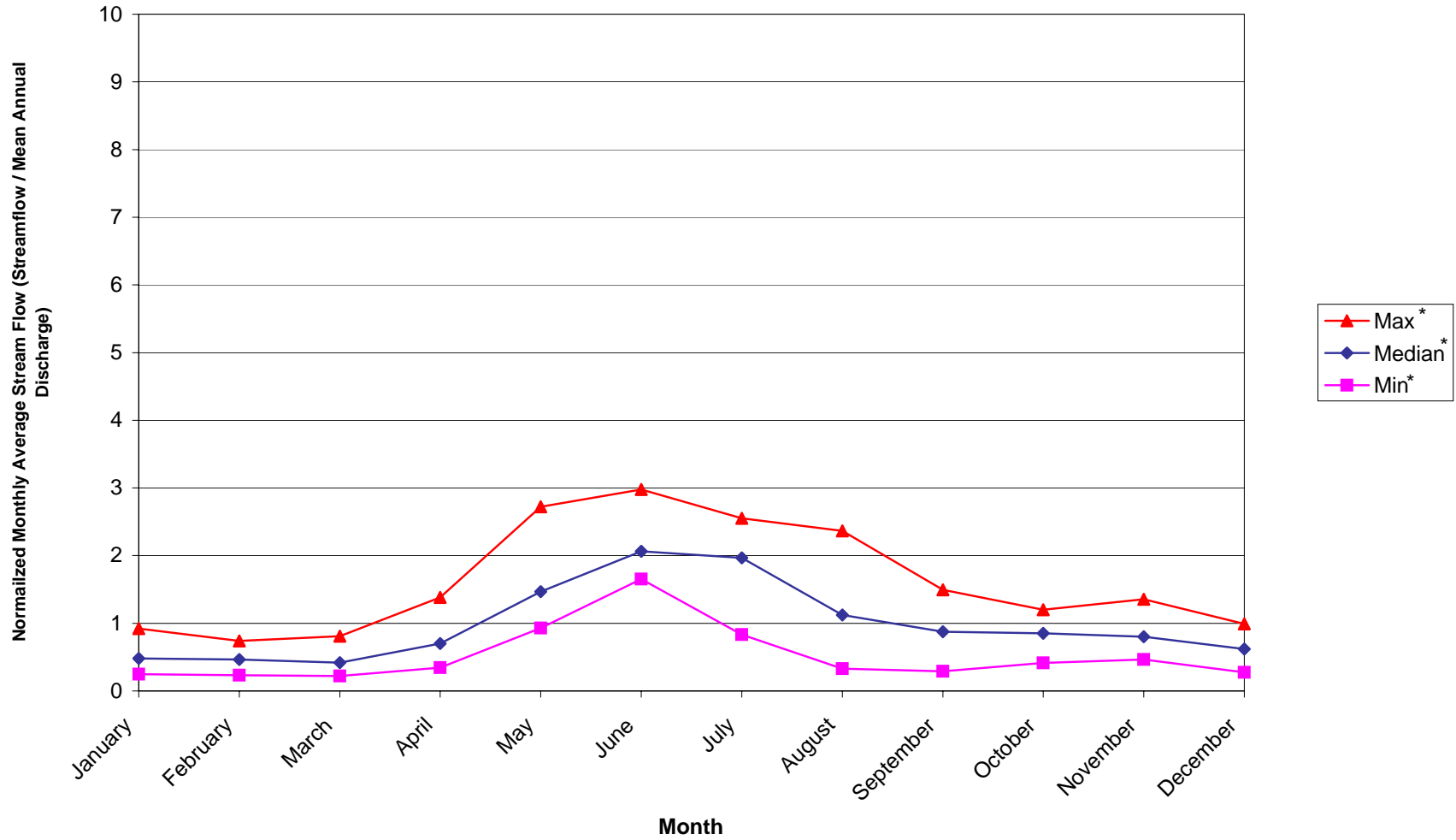


Figure A-26

* Of normalized monthly average stream flow

Hydrologic Zone 27
 Monthly Average Stream Flows (21 WSC Gauges)

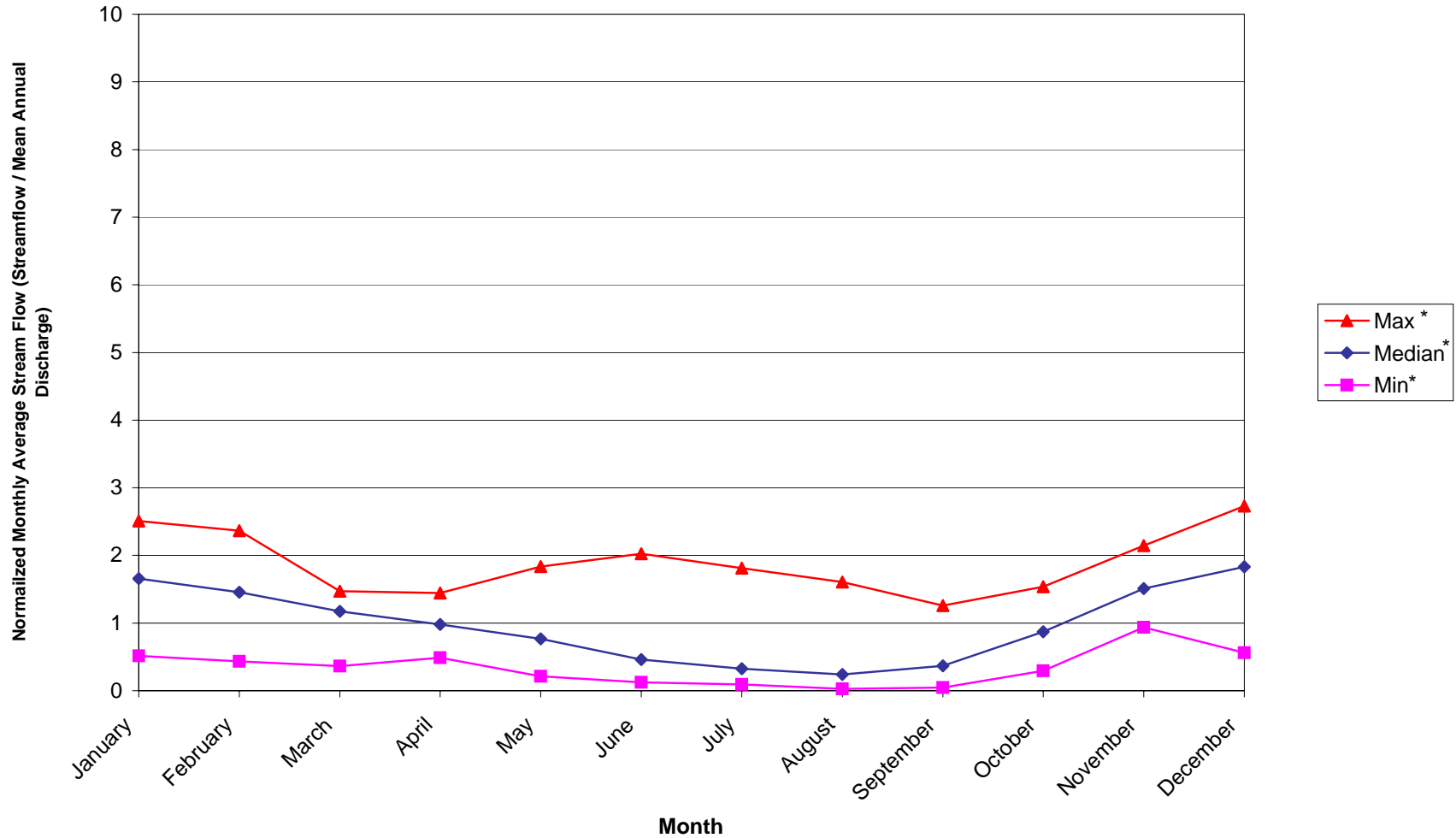


Figure A-27

* Of normalized monthly average stream flow

Hydrologic Zone 28
 Monthly Average Stream Flows (16 WSC Gauges)

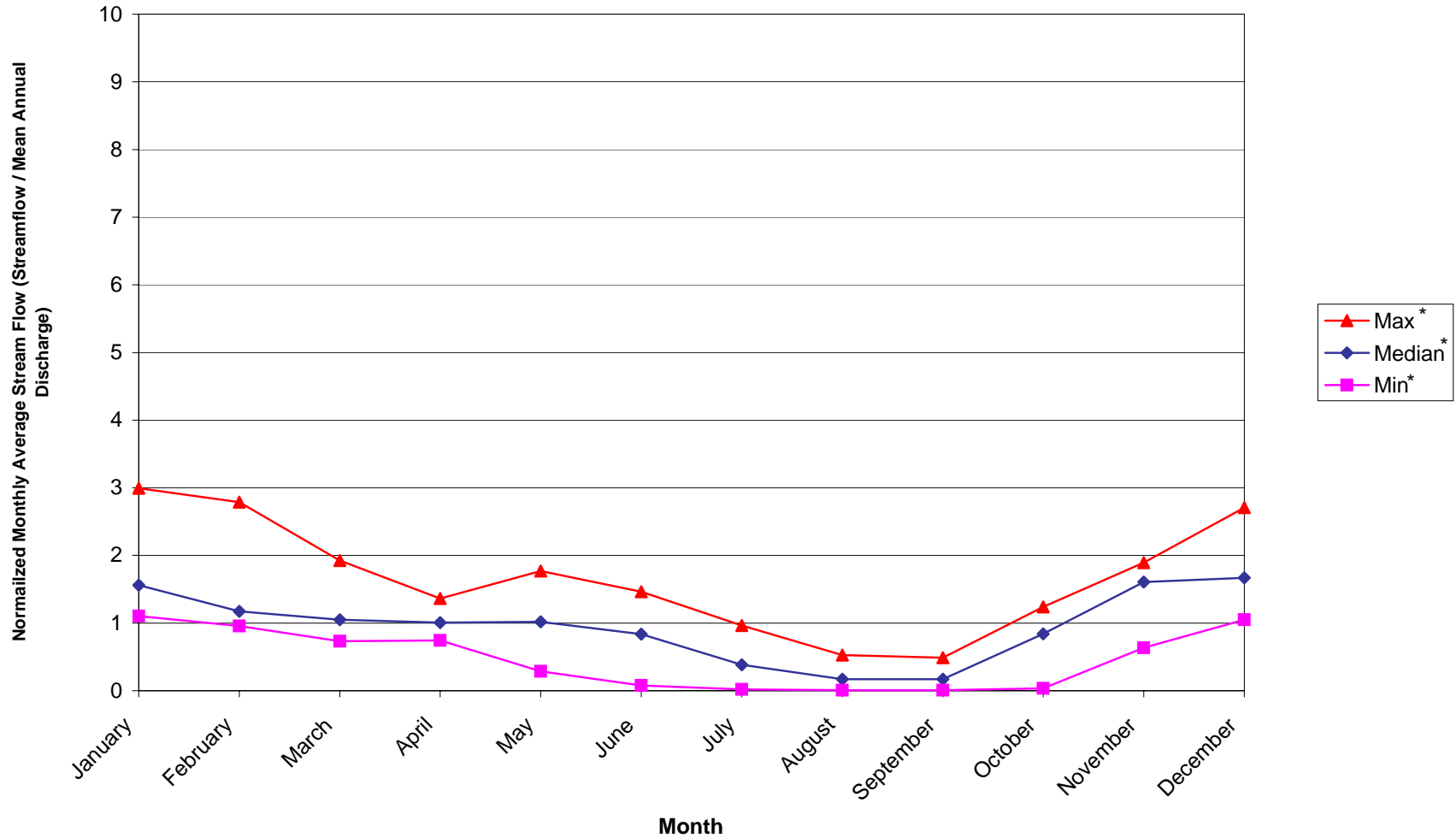


Figure A-28

* Of normalized monthly average stream flow

Hydrologic Zone 29
 Monthly Average Stream Flows (8 WSC Gauges)

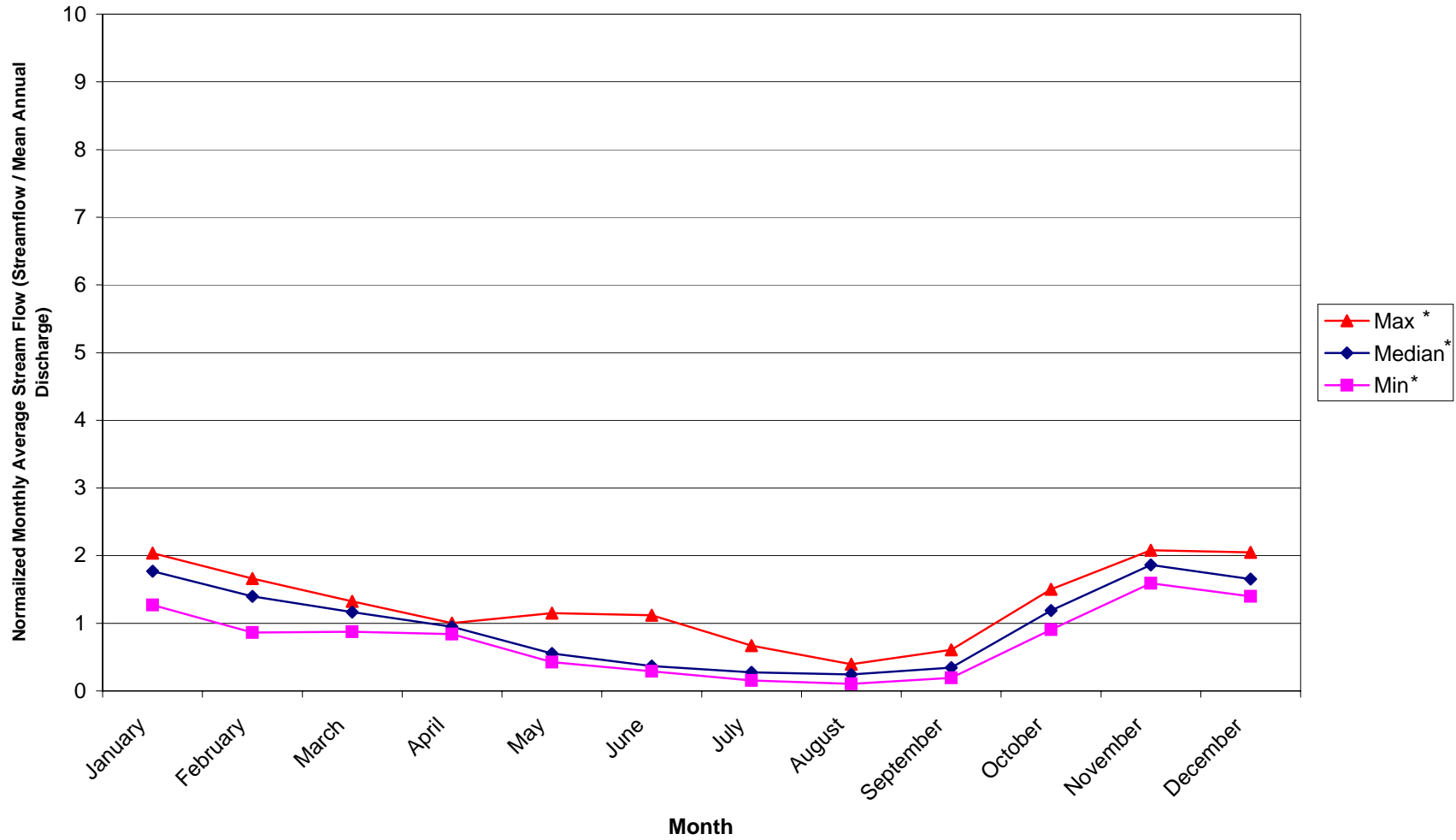


Figure A-29

* Of normalized monthly average stream flow

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-1: WSC Gauge Data and Factors

Hydrologic Zone	Number of Gauges	Drainage Area (km ²)		Plant Capacity Factor (%)			Firm Energy Factor (%)			Dependable Capacity Factor (%)		
		Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max
1	10	12.4	42300	39.5%	35.6%	42.7%	32.6%	28.2%	36.6%	0.0%	0.0%	0.0%
2	11	240	29000	36.0%	30.5%	38.2%	26.5%	14.9%	35.0%	0.0%	0.0%	0.0%
3	24	77.8	104000	37.6%	33.0%	50.7%	29.7%	19.6%	37.0%	0.9%	0.0%	21.5%
4	9	109	119000	31.8%	23.9%	39.3%	23.1%	11.8%	30.7%	0.0%	0.0%	0.0%
5	6	29.2	12400	37.3%	33.5%	40.0%	29.8%	25.8%	34.1%	0.0%	0.0%	0.0%
6	10	303	15600	28.6%	19.5%	35.5%	17.9%	1.4%	28.4%	0.0%	0.0%	0.0%
7	8	29.5	12100	31.7%	26.0%	36.5%	22.1%	10.3%	29.7%	0.0%	0.0%	0.0%
8	30	10.8	32400	34.3%	22.0%	50.6%	22.3%	10.9%	39.7%	0.0%	0.0%	0.0%
9	6	86.5	25900	40.2%	37.0%	43.8%	32.7%	25.3%	37.6%	0.0%	0.0%	0.0%
10	10	39.4	1990	41.9%	36.3%	44.6%	33.7%	27.2%	39.3%	0.0%	0.0%	0.0%
11	2	76.7	477	41.1%	39.1%	43.2%	33.3%	31.9%	34.7%	23.4%	21.1%	25.6%
12	5	103	18000	39.3%	36.4%	41.0%	31.4%	27.0%	35.5%	0.0%	0.0%	0.0%
13	7	132	6890	35.2%	29.7%	37.8%	31.7%	27.8%	34.7%	0.0%	0.0%	0.0%
14	19	20.8	5930	36.8%	25.7%	42.6%	30.2%	12.1%	40.6%	0.0%	0.0%	0.0%
15	35	7.25	39100	33.9%	21.7%	55.4%	22.6%	0.8%	36.8%	0.9%	0.0%	30.5%
16	11	144	17700	33.1%	27.6%	39.3%	24.4%	16.7%	37.5%	0.0%	0.0%	0.0%
17	8	15.5	54900	31.5%	22.6%	39.2%	18.7%	4.7%	34.6%	0.0%	0.0%	0.0%
18	18	21.2	14000	36.7%	28.9%	52.3%	32.3%	17.9%	43.5%	1.8%	0.0%	31.5%
19	8	83.9	5390	32.6%	29.8%	35.3%	22.4%	14.7%	30.4%	0.0%	0.0%	0.0%
20	20	6.4	20000	29.8%	24.4%	34.6%	19.3%	10.7%	26.3%	0.0%	0.0%	0.0%
21	16	4.4	2160	33.1%	25.8%	46.2%	23.1%	14.0%	35.6%	0.0%	0.0%	0.0%
22	22	1.01	28500	33.7%	26.5%	47.8%	25.1%	15.4%	39.3%	1.1%	0.0%	25.3%
23	11	13.5	2050	27.0%	22.8%	30.5%	16.6%	11.9%	20.8%	0.0%	0.0%	0.0%
24	24	3.73	5960	24.6%	12.9%	28.7%	12.9%	2.7%	19.0%	0.0%	0.0%	0.0%
25	11	85.5	4070	36.3%	28.7%	42.5%	26.6%	18.0%	36.4%	0.0%	0.0%	0.0%
26	25	40.4	7870	42.9%	35.6%	48.5%	31.7%	16.1%	42.1%	0.0%	0.0%	0.0%
27	21	2.59	3900	35.4%	27.4%	47.4%	24.3%	14.9%	38.8%	6.7%	0.0%	40.1%
28	16	12.4	1400	36.5%	29.8%	45.3%	24.9%	11.2%	38.9%	10.1%	0.0%	36.6%
29	8	2.53	580	32.9%	27.4%	40.9%	25.2%	19.2%	32.5%	0.0%	0.0%	0.0%

Note: The Plant Capacity, Firm Energy, and Dependable Capacity Factors shown in this table account for minimum fisheries flow releases of 15% of the mean annual discharge (MAD) and one of the turbine shutoff cases: turbine shut off at 20% design flow. Design flow = 1.5 x MAD

KERR WOOD LEIDAL ASSOCIATES LTD.
Consulting Engineers

O:\0400-0499\478-103\442-Hydrology\Hydrology-Appendix-2010Update-EM.xls\EM_TableA-1 WSCGaugeDataFina

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT FOR BRITISH COLUMBIA 2010 UPDATE FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
07EA002	KWADACHA RIVER NEAR WARE	3	NATURAL	N	2,410	1960-1998	35	33.0	1615	50.85	0.02	7.627	1994	37.6%	35.1%	0.0%
07EA004	INGENIKA RIVER ABOVE SWANNELL RIVER	3	NATURAL	Y	4,150	1977-2005	29	28.0	1628	59.34	0.01	8.901	1979	34.0%	32.1%	0.0%
07EA005	FINLAY RIVER ABOVE AKIE RIVER	3	NATURAL	Y	15,600	1978-2005	28	27.0	N/A	263.81	0.02	39.572	1997	36.3%	32.6%	0.0%
07EA007	AKIE RIVER NEAR THE 760 M CONTOUR	3	NATURAL	Y	1,690	1981-2005	25	25.0	N/A	31.72	0.02	4.757	2003	36.2%	33.0%	0.0%
07EB002	OSPIKA RIVER ABOVE ALEY CREEK	3	NATURAL	Y	2,190	1981-2005	25	25.0	1613	41.25	0.02	6.188	1990	34.0%	31.2%	0.0%
07EC002	OMINECA RIVER ABOVE OSILINKA RIVER	8	NATURAL	Y	5,560	1975-2005	31	30.0	1421	90.81	0.02	13.622	1979	31.6%	24.7%	0.0%
07EC003	MESILINKA RIVER ABOVE GOPHERHOLE CREEK	8	NATURAL	Y	3,060	1976-2005	30	30.0	1537	45.51	0.01	6.827	1977	34.3%	26.3%	0.0%
07EC004	OSILINKA RIVER NEAR END LAKE	8	NATURAL	Y	1,950	1981-2005	25	25.0	1519	36.30	0.02	5.444	1988	31.8%	30.3%	0.0%
07ED001	NATION RIVER NEAR FORT ST. JAMES	8	NATURAL	N	4,350	1938-1995	55	28.0	N/A	56.96	0.01	8.544	1979	28.4%	18.6%	0.0%
07ED003	NATION RIVER NEAR THE MOUTH	8	NATURAL	Y	6,790	1981-2005	25	25.0	1258	82.85	0.01	12.427	1988	29.4%	19.8%	0.0%
07EE007	PARSNIP RIVER ABOVE MISINCHINKA RIVER	7	NATURAL	Y	4,930	1967-2005	38	37.0	1266	147.55	0.03	22.133	1977	35.0%	25.5%	0.0%
07EE009	CHUCHINKA CREEK NEAR THE MOUTH	8	NATURAL	Y	310	1975-2005	31	30.0	1089	5.06	0.02	0.759	1988	28.0%	12.8%	0.0%
07EE010	PACK RIVER AT OUTLET OF MCLEOD LAKE	8	NATURAL	Y	3,710	1981-2005	25	25.0	1011	42.95	0.01	6.442	1988	31.0%	14.5%	0.0%
07FA001	HALFWAY RIVER NEAR FARRELL CREEK (LOWER STATION)	6	NATURAL	N	9,400	1961-1983	23	19.0	N/A	75.80	0.01	11.371	1974	34.6%	28.4%	0.0%
07FA003	HALFWAY RIVER ABOVE GRAHAM RIVER	6	NATURAL	N	3,780	1977-1995	19	18.0	N/A	35.57	0.01	5.335	1990	33.5%	27.7%	0.0%
07FA005	GRAHAM RIVER ABOVE COLT CREEK	3	NATURAL	Y	2,200	1981-2005	23	23.0	1485	25.04	0.01	3.756	1990	33.7%	26.9%	0.0%
07FA006	HALFWAY RIVER NEAR FARRELL CREEK	6	NATURAL	Y	9,330	1984-2005	22	22.0	1265	76.88	0.01	11.532	1990	32.4%	23.3%	0.0%
07FB001	PINE RIVER AT EAST PINE	7	NATURAL	Y	12,100	1961-2005	45	41.0	1276	190.84	0.02	28.626	1992	33.2%	29.0%	0.0%
07FB002	MURRAY RIVER NEAR THE MOUTH	7	NATURAL	Y	5,550	1977-2005	29	28.0	1346	84.44	0.02	12.666	1992	35.6%	27.9%	0.0%
07FB003	SUKUNKA RIVER NEAR THE MOUTH	7	NATURAL	Y	2,590	1977-2005	29	28.0	1329	55.19	0.02	8.278	1992	31.8%	28.0%	0.0%
07FB004	DICKEBUSCH CREEK NEAR THE MOUTH	7	NATURAL	Y	82	1978-2005	28	28.0	1221	0.61	0.01	0.092	1991	26.0%	12.2%	0.0%
07FB005	QUALITY CREEK NEAR THE MOUTH	7	NATURAL	N	30	1978-2001	24	22.9	1234	0.19	0.01	0.028	1991	26.7%	10.3%	0.0%
07FB006	MURRAY RIVER ABOVE WOLVERINE RIVER	7	NATURAL	Y	2,370	1977-2005	29	28.0	1456	57.18	0.02	8.577	1992	36.5%	29.7%	0.0%
07FB008	MOBERLY RIVER NEAR FORT ST. JOHN	6	NATURAL	Y	1,520	1980-2005	26	26.0	1104	11.77	0.01	1.765	1998	31.2%	25.8%	0.0%
07FB009	FLATBED CREEK AT KILOMETRE 110 HERITAGE HIGHWAY	7	NATURAL	Y	486	1982-2005	24	22.0	1301	4.17	0.01	0.625	1987	29.1%	14.5%	0.0%
07FC001	BEATON RIVER NEAR FORT ST. JOHN	6	NATURAL	Y	15,600	1961-2005	45	40.0	N/A	54.98	0.00	8.247	1994	27.2%	17.2%	0.0%
07FC003	BLUEBERRY RIVER BELOW AITKEN CREEK	6	NATURAL	Y	1,770	1964-2005	42	40.0	973	5.51	0.00	0.827	1994	21.1%	12.6%	0.0%
07FD001	KISKATINAW RIVER NEAR FARMINGTON	6	NATURAL	Y	3,640	1944-2005	51	42.0	1029	10.76	0.00	1.614	1991	25.9%	10.3%	0.0%
07FD004	ALCES RIVER AT 22ND BASE LINE	6	NATURAL	Y	303	1963-2005	22	21.0	907	0.61	0.00	0.091	1998	25.1%	7.6%	0.0%
07FD007	POUCE COUPE RIVER BELOW HENDERSON CREEK	6	NATURAL	Y	2,850	1971-2005	33	30.0	N/A	6.98	0.00	1.046	1988	19.5%	1.4%	0.0%
08BB001	TAKU RIVER NEAR TULSEQUAH	1	NATURAL	N	15,500	1953-1987	35	20.9	N/A	264.42	0.02	39.663	1977	39.5%	31.7%	0.0%
08BB002	SLOKO RIVER NEAR ATLIN	2	NATURAL	N	427	1954-1979	23	15.0	N/A	9.73	0.02	1.460	1972	36.5%	31.5%	0.0%
08CA001	SPATSIZI RIVER NEAR THE MOUTH	3	NATURAL	N	3,400	1980-1995	16	14.0	N/A	60.21	0.02	9.032	1981	34.4%	28.9%	0.0%
08CA002	STIKINE RIVER BELOW SPATSIZI RIVER	3	NATURAL	N	7,690	1980-1995	16	14.0	N/A	131.71	0.02	19.757	1981	35.1%	28.3%	0.0%
08CA003	PITMAN RIVER NEAR THE MOUTH	5	NATURAL	N	2,730	1980-1995	16	14.0	N/A	45.91	0.02	6.886	1985	36.1%	28.4%	0.0%
08CB001	STIKINE RIVER ABOVE GRAND CANYON	2	NATURAL	N	18,800	1957-1995	39	30.0	N/A	300.82	0.02	45.123	1977	37.3%	28.2%	0.0%
08CC001	KLAPPAN RIVER NEAR TELEGRAPH CREEK	5	NATURAL	N	3,550	1962-1996	35	31.0	N/A	72.31	0.02	10.847	1977	37.2%	30.9%	0.0%
08CC002	UNNAMED CREEK AT SITE NO. 10	29	NATURAL	N	29	1986-1996	11	9.0	N/A	1.49	0.05	0.224	1994	33.5%	34.1%	0.0%
08CD001	TUYA RIVER NEAR TELEGRAPH CREEK	2	NATURAL	Y	3,560	1962-2005	44	39.9	1316	35.92	0.01	5.387	1977	30.5%	17.8%	0.0%
08CE001	STIKINE RIVER AT TELEGRAPH CREEK	2	NATURAL	Y	29,000	1954-2005	52	41.0	1495	405.61	0.01	60.842	1977	37.6%	26.9%	0.0%
08CF001	STIKINE RIVER ABOVE BUTTERFLY CREEK	1	NATURAL	N	36,000	1971-1995	25	23.0	N/A	656.32	0.02	98.447	1977	39.6%	28.9%	0.0%
08CG001	ISKUT RIVER BELOW JOHNSON RIVER	1	NATURAL	Y	9,350	1959-2005	47	41.9	N/A	454.60	0.05	68.191	1973	41.2%	35.8%	0.0%
08CG003	ISKUT RIVER AT OUTLET OF KINASKAN LAKE	5	NATURAL	N	1,250	1964-1996	33	29.0	N/A	17.20	0.01	2.581	1977	39.7%	25.8%	0.0%
08CG004	ISKUT RIVER ABOVE SNIPPAKER CREEK	1	NATURAL	N	7,230	1966-1995	29	26.0	N/A	287.23	0.04	43.084	1973	39.5%	34.6%	0.0%
08CG005	MORE CREEK NEAR THE MOUTH	1	NATURAL	N	844	1972-1995	24	20.8	N/A	48.97	0.06	7.345	1977	38.4%	33.6%	0.0%
08CG006	FORREST KERR CREEK ABOVE 460 M CONTOUR	1	NATURAL	N	311	1972-1994	23	20.0	N/A	28.37	0.09	4.256	1975	35.6%	28.2%	0.0%
08DA005	SURPRISE CREEK NEAR THE MOUTH	1	NATURAL	Y	218	1967-2005	39	37.0	1400	15.39	0.07	2.309	1984	39.2%	32.0%	0.0%
08DB001	NASS RIVER ABOVE SHUMAL CREEK	1	NATURAL	Y	18,400	1929-2005	71	52.9	1213	787.24	0.04	118.086	1977	42.7%	36.6%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area km ²	Period	Number of Years Recorded	Net Years	Mean Basin Elevation m	Mean Annual Discharge (MAD) m ³ /s	Mean Annual Runoff (MAF) m ³ /s/km ²	Fishflow (15% of MAF) m ³ /s	Minimum Flow Year (for firm energy)	Plant Capacity Factor (1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)	Firm Energy Factor	Dependable Capacity Factor
08DB010	LIME CREEK NEAR THE MOUTH	10	NATURAL	N	39	1976-1996	21	16.8	N/A	1.75	0.04	0.262	1994	36.3%	27.2%	0.0%
08DB011	KITSALUT RIVER ABOVE KLAYDUC CREEK	10	NATURAL	N	242	1981-1996	16	14.0	N/A	22.68	0.09	3.402	1985	43.1%	34.4%	0.0%
08DC006	BEAR RIVER ABOVE BITTER CREEK	10	NATURAL	N	350	1967-1999	33	31.0	1357	25.18	0.07	3.777	1973	40.5%	33.0%	0.0%
08DD001	UNUK RIVER NEAR STEWART	10	NATURAL	N	1,480	1960-1996	33	29.0	N/A	104.69	0.07	15.704	1973	42.0%	35.7%	0.0%
08EB003	SKEENA RIVER AT GLEN VOWELL	9	NATURAL	N	25,900	1960-1985	26	25.0	N/A	589.35	0.02	88.403	1977	38.4%	31.5%	0.0%
08EB004	KISPIOX RIVER NEAR HAZELTON	5	NATURAL	Y	1,880	1963-2005	43	39.0	981	45.47	0.02	6.821	1977	40.0%	29.0%	0.0%
08EB005	SKEENA RIVER ABOVE BABINE RIVER	5	NATURAL	N	12,400	1970-1996	27	25.0	N/A	361.19	0.03	54.178	1977	37.0%	30.5%	0.0%
08EC001	BABINE RIVER AT BABINE	8	NATURAL	Y	6,350	1929-1985	44	39.0	1120	46.33	0.01	6.949	1979	43.8%	23.5%	0.0%
08EC013	BABINE RIVER AT OUTLET OF NILKITKWA LAKE	8	NATURAL	Y	6,760	1972-2005	34	33.0	1125	49.29	0.01	7.394	1979	44.3%	25.8%	0.0%
08ED001	NANIKA RIVER AT OUTLET OF KIDPRICE LAKE	9	NATURAL	Y	735	1950-2005	37	33.0	1433	28.83	0.04	4.324	1982	40.9%	31.9%	0.0%
08ED002	MORICE RIVER NEAR HOUSTON	9	NATURAL	Y	1,900	1961-2005	45	44.0	1386	75.29	0.04	11.294	1982	43.8%	35.7%	0.0%
08EE004	BULKLEY RIVER AT QUICK	8	NATURAL	Y	7,350	1930-2005	76	59.0	1220	134.13	0.02	20.119	1979	41.4%	32.4%	0.0%
08EE008	GOATHORN CREEK NEAR TELKWA	8	NATURAL	Y	126	1960-2005	46	43.9	1365	1.77	0.01	0.266	1999	36.8%	27.9%	0.0%
08EE012	SIMPSON CREEK AT THE MOUTH	13	NATURAL	Y	13	1969-2005	35	29.0	1341	0.26	0.02	0.040	1994	34.3%	23.2%	0.0%
08EE013	BUCK CREEK AT THE MOUTH	8	NATURAL	Y	566	1973-2005	33	32.0	1241	4.26	0.01	0.639	2002	24.7%	19.1%	0.0%
08EE020	TELKWA RIVER BELOW TSAI CREEK	9	NATURAL	Y	368	1975-2005	31	30.0	1479	14.30	0.04	2.145	1979	40.1%	37.6%	0.0%
08EE025	TWO MILE CREEK IN DISTRICT LOT 4834	8	NATURAL	Y	22	1982-2005	24	23.0	932	0.12	0.01	0.019	1994	50.6%	16.2%	0.0%
08EE028	STATION CREEK ABOVE DIVERSIONS	8	NATURAL	N	11	1985-1996	12	10.0	N/A	0.28	0.03	0.042	1994	36.3%	29.2%	0.0%
08EF001	SKEENA RIVER AT USK	1	NATURAL	Y	42,300	1928-2005	74	65.9	1242	911.10	0.02	136.665	1977	39.7%	33.6%	0.0%
08EF005	ZYMOETZ RIVER ABOVE O.K. CREEK	9	NATURAL	Y	2,980	1963-2005	43	42.0	1302	105.88	0.04	15.882	1982	40.7%	34.5%	0.0%
08EG011	ZYMAGOTITZ RIVER NEAR TERRACE	10	NATURAL	N	376	1960-1995	36	32.0	N/A	23.73	0.06	3.559	1985	43.2%	33.0%	0.0%
08EG012	EXCHAMSIKS RIVER NEAR TERRACE	10	NATURAL	Y	370	1962-2005	44	41.9	1015	43.33	0.12	6.499	1985	44.6%	39.3%	0.0%
08EG017	DEEP CREEK ABOVE RESERVOIR	1	NATURAL	Y	12	1992-2005	14	14.0	789	0.56	0.04	0.084	1997	39.9%	30.7%	0.0%
08FA007	WANNOCK RIVER AT OUTLET OF OWIKENO LAKE	27	NATURAL	Y	3,900	1927-2005	53	47.0	1336	324.24	0.08	48.636	1982	47.4%	38.8%	0.0%
08FB002	BELLA COOLA RIVER NEAR HAGENSBORG	26	NATURAL	N	4,040	1947-1968	22	18.0	N/A	119.22	0.03	17.884	1948	42.8%	33.9%	0.0%
08FB004	SALLOOMT RIVER NEAR HAGENSBORG	26	NATURAL	Y	159	1965-2005	41	33.7	1242	8.84	0.06	1.327	2003	45.3%	35.5%	0.0%
08FB005	NUSATSUM RIVER NEAR HAGENSBORG	26	NATURAL	N	269	1965-1996	32	23.9	N/A	16.42	0.06	2.463	1979	43.6%	34.7%	0.0%
08FB006	ATNARKO RIVER NEAR THE MOUTH	25	NATURAL	Y	2,430	1965-2005	41	35.0	1557	27.67	0.01	4.151	2000	36.9%	21.5%	0.0%
08FB007	BELLA COOLA RIVER ABOVE BURNT BRIDGE CREEK	25	NATURAL	Y	3,720	1965-2005	41	35.0	1614	89.55	0.02	13.433	2000	42.5%	33.9%	0.0%
08FB009	CLAYTON FALLS CREEK NEAR THE MOUTH	26	NATURAL	N	93	1979-1996	18	16.0	N/A	6.29	0.07	0.943	1988	45.9%	42.1%	0.0%
08FC003	DEAN RIVER BELOW TANSWANKET CREEK	15	NATURAL	Y	3,780	1959-2005	43	33.0	1472	16.07	0.00	2.411	2002	31.4%	17.2%	0.0%
08FE003	KEMANO RIVER ABOVE POWERHOUSE TAILRACE	10	NATURAL	Y	583	1971-2005	35	34.0	1300	46.11	0.08	6.917	1982	42.0%	37.0%	0.0%
08FF001	KITIMAT RIVER BELOW HIRSCH CREEK	10	NATURAL	Y	1,990	1964-2005	42	39.0	956	131.42	0.07	19.713	1985	44.4%	34.8%	0.0%
08FF002	HIRSCH CREEK NEAR THE MOUTH	10	NATURAL	Y	347	1966-2005	40	39.0	1067	22.06	0.06	3.308	1982	42.1%	31.8%	0.0%
08FF003	LITTLE WEDEENE RIVER BELOW BOWBYES CREEK	10	NATURAL	Y	182	1966-2005	40	37.0	881	17.52	0.10	2.628	1994	41.1%	31.3%	0.0%
08GA024	CHEAKAMUS RIVER NEAR MONS	26	NATURAL	N	287	1924-1948	25	23.0	N/A	19.67	0.07	2.950	1932	41.3%	36.2%	0.0%
08GA052	NOONS CREEK NEAR PORT MOODY	27	NATURAL	N	7	1960-1976	17	10.0	N/A	0.41	0.06	0.061	1969	34.2%	25.9%	0.0%
08GA054	MAMQUAM RIVER ABOVE MASHITER CREEK	26	NATURAL	N	334	1966-1986	20	16.8	N/A	25.63	0.08	3.845	1969	43.7%	27.9%	0.0%
08GA060	CHAPMAN CREEK ABOVE SECHELT DIVERSION	27	NATURAL	N	65	1970-1988	19	16.0	N/A	4.37	0.07	0.655	1978	36.3%	26.3%	0.0%
08GA061	MACKAY CREEK AT MONTROYAL BOULEVARD	27	NATURAL	Y	4	1970-2005	35	30.9	599	0.23	0.06	0.035	2000	35.0%	23.7%	0.0%
08GA064	STAWAMUS RIVER BELOW RAY CREEK	26	NATURAL	N	40	1972-1989	18	14.3	N/A	3.79	0.09	0.569	1976	36.9%	28.1%	0.0%
08GA065	NOONS CREEK AT MERIDIAN SUBSTATION ROAD	27	NATURAL	N	3	1976-1996	21	17.8	855	0.25	0.10	0.038	1978	30.6%	25.7%	0.0%
08GA071	ELAHO RIVER NEAR THE MOUTH	26	NATURAL	Y	1,250	1981-2005	25	24.0	1614	104.11	0.08	15.616	2000	42.9%	37.8%	0.0%
08GA072	CHEAKAMUS RIVER ABOVE MILLAR CREEK	26	NATURAL	Y	285	1982-2005	24	23.8	1740	19.29	0.07	2.894	1992	42.1%	36.6%	0.0%
08GA075	MAMQUAM RIVER ABOVE RING CREEK	26	NATURAL	Y	281	1990-2005	15	12.0	1292	23.59	0.08	3.538	2000	44.5%	35.3%	0.0%
08GA077	SEYMOUR RIVER BELOW ORCHID CREEK	27	NATURAL	Y	63	1992-2005	14	12.9	1080	6.49	0.10	0.973	2000	40.2%	29.2%	0.0%
08GD004	HOMATHKO RIVER AT THE MOUTH	26	NATURAL	Y	5,720	1957-2005	49	38.8	1774	273.90	0.05	41.085	2000	40.1%	34.4%	0.0%
08GD006	HOMATHKO RIVER AT TRAGEDY CANYON	25	NATURAL	N	4,070	1960-1995	21	10.7	N/A	133.76	0.03	20.064	1983	40.4%	29.9%	0.0%
08GD007	MOSLEY CREEK NEAR DUMBELL LAKE	25	NATURAL	N	1,550	1960-1995	25	13.8	N/A	49.33	0.03	7.400	1983	38.8%	29.2%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrwoodeidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area km ²	Period	Number of Years Recorded	Net Years	Mean Basin Elevation m	Mean Annual Discharge (MAD) m ³ /s	Mean Annual Runoff (MAF) m ³ /s/km ²	Fishflow (15% of MAF) m ³ /s	Minimum Flow Year (for firm energy)	Plant Capacity Factor (1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)	Firm Energy Factor	Dependable Capacity Factor
08GD008	HOMATHKO RIVER AT INLET TO TATLAYOKO LAKE	15	NATURAL	Y	500	1968-2005	32	23.0	1576	1.76	0.00	0.264	1987	40.1%	27.4%	0.0%
08GE002	KLINAKLINI RIVER EAST CHANNEL (MAIN) NEAR THE MOUTH	26	NATURAL	Y	5,780	1977-2005	29	27.0	1644	296.19	0.05	44.429	2000	41.9%	36.6%	0.0%
08HA001	CHEMAINUS RIVER NEAR WESTHOLME	28	NATURAL	Y	355	1914-2005	58	51.9	756	18.62	0.05	2.793	2000	35.4%	22.9%	21.6%
08HA003	KOKSILAH RIVER AT COWICHAN STATION	28	NATURAL	Y	209	1914-2005	56	48.0	585	9.69	0.05	1.454	1976	32.7%	17.6%	26.6%
08HA010	SAN JUAN RIVER NEAR PORT RENFREW	29	NATURAL	Y	580	1959-2005	45	38.9	663	48.67	0.08	7.300	2000	32.9%	24.1%	0.0%
08HA016	BINGS CREEK NEAR THE MOUTH	28	NATURAL	Y	16	1961-2005	45	39.8	336	0.46	0.03	0.070	1976	29.8%	11.2%	28.8%
08HA026	CUSHEON CREEK AT OUTLET OF CUSHEON LAKE	28	NATURAL	N	12	1970-1998	25	20.0	330	0.13	0.01	0.019	1978	30.7%	12.1%	22.8%
08HB002	ENGLISHMAN RIVER NEAR PARKSVILLE	28	NATURAL	Y	324	1913-2005	34	28.0	695	13.48	0.04	2.022	2000	33.8%	21.9%	0.0%
08HB014	SARITA RIVER NEAR BAMFIELD	29	NATURAL	Y	162	1948-2005	56	52.0	535	19.72	0.12	2.958	1964	31.2%	23.5%	0.0%
08HB024	TSABLE RIVER NEAR FANNY BAY	28	NATURAL	Y	113	1960-2005	46	44.0	852	7.85	0.07	1.177	1984	34.0%	21.8%	0.0%
08HB025	BROWNS RIVER NEAR COURTENAY	28	NATURAL	Y	86	1960-2005	33	24.5	982	5.66	0.07	0.849	2000	35.4%	25.6%	0.0%
08HB032	MILLSTONE RIVER AT NANAIMO	28	NATURAL	Y	86	1961-2005	25	19.9	446	2.49	0.03	0.373	1987	34.0%	21.9%	36.6%
08HB048	CARNATION CREEK AT THE MOUTH	29	NATURAL	Y	10	1972-2005	34	33.0	453	0.81	0.08	0.122	1978	27.4%	19.2%	0.0%
08HB069	CARNATION CREEK AT 150 M CONTOUR	29	NATURAL	N	3	1980-1999	20	17.9	626	0.22	0.09	0.033	1993	29.1%	21.8%	0.0%
08HB074	CRUICKSHANK RIVER NEAR THE MOUTH	28	NATURAL	Y	214	1982-2005	24	23.0	1084	17.72	0.08	2.658	1989	41.5%	31.0%	0.0%
08HB075	DOVE CREEK NEAR THE MOUTH	28	NATURAL	Y	41	1985-2005	21	20.0	502	1.89	0.05	0.283	2000	32.7%	24.8%	0.0%
08HB086	TOFINO CREEK NEAR THE MOUTH	29	NATURAL	Y	39	1995-2005	11	10.0	788	6.73	0.17	1.010	2000	33.6%	28.2%	0.0%
08HC002	UCONA RIVER AT THE MOUTH	29	NATURAL	Y	187	1957-2005	47	41.3	991	17.92	0.10	2.687	2000	40.9%	32.5%	0.0%
08HD001	CAMPBELL RIVER AT OUTLET OF CAMPBELL LAKE	28	NATURAL	N	1,400	1910-1949	40	37.0	N/A	85.97	0.06	12.896	1916	45.3%	32.1%	0.0%
08HD011	OYSTER RIVER BELOW WOODHUS CREEK	28	NATURAL	Y	303	1973-2005	33	28.0	1027	13.85	0.05	2.077	2000	39.9%	28.5%	0.0%
08HD015	SALMON RIVER ABOVE CAMPBELL LAKE DIVERSION	28	NATURAL	Y	268	1981-2005	25	23.0	946	13.25	0.05	1.988	1984	38.0%	23.2%	0.0%
08HE006	ZEBALLOS RIVER NEAR ZEBALLOS	29	NATURAL	Y	178	1959-2005	47	44.7	836	25.73	0.14	3.860	1984	35.6%	23.7%	0.0%
08HF001	KOKISH RIVER AT BEAVER COVE	28	NATURAL	N	290	1927-1941	15	12.4	N/A	18.27	0.06	2.741	1931	44.5%	38.9%	25.3%
08HF004	TSITIKA RIVER BELOW CATHERINE CREEK	28	NATURAL	Y	365	1974-2005	32	30.0	892	22.47	0.06	3.371	1988	37.0%	30.6%	0.0%
08HF005	NIMPKISH RIVER ABOVE WOSS RIVER	28	NATURAL	Y	783	1990-2005	16	15.9	829	59.79	0.08	8.969	2000	39.6%	34.5%	0.0%
08HF006	SAN JOSEF RIVER BELOW SHARP CREEK	29	NATURAL	Y	64	1990-2005	14	12.0	333	7.88	0.12	1.182	2000	32.7%	28.8%	0.0%
08JA002	OOTSА RIVER AT OOTSА LAKE	8	NATURAL	N	4,450	1929-1952	24	18.9	N/A	98.81	0.02	14.821	1931	42.5%	39.7%	0.0%
08JA014	VAN TINE CREEK NEAR THE MOUTH	8	NATURAL	Y	150	1974-2005	32	31.0	1394	0.91	0.01	0.136	1979	28.8%	22.4%	0.0%
08JA015	LAVENTIE CREEK NEAR THE MOUTH	9	NATURAL	Y	87	1976-2005	30	29.0	1560	5.29	0.06	0.793	1981	37.0%	25.3%	0.0%
08JA016	MACIVOR CREEK NEAR THE MOUTH	8	NATURAL	N	53	1976-1995	20	16.0	N/A	0.92	0.02	0.139	1985	32.9%	23.5%	0.0%
08JB002	STELLAKO RIVER AT GLENANNAN	8	NATURAL	Y	3,600	1929-2005	58	54.0	1088	20.59	0.01	3.088	1979	37.8%	17.8%	0.0%
08JB003	NAUTLEY RIVER NEAR FORT FRASER	8	NATURAL	Y	6,030	1950-2005	54	52.0	1070	30.69	0.01	4.603	1979	37.7%	13.0%	0.0%
08JC005	CHILAKO RIVER NEAR PRINCE GEORGE	8	NATURAL	N	3,390	1960-1974	15	11.0	N/A	12.92	0.00	1.937	1970	31.7%	22.6%	0.0%
08JD006	DRIFTWOOD RIVER ABOVE KASTBERG CREEK	8	NATURAL	Y	403	1979-2005	26	23.0	1295	8.24	0.02	1.236	1985	29.9%	21.8%	0.0%
08JE001	STUART RIVER NEAR FORT ST. JAMES	8	NATURAL	Y	14,200	1929-2005	76	63.9	1097	130.82	0.01	19.623	1979	45.4%	24.4%	0.0%
08JE004	TSILCOH RIVER NEAR THE MOUTH	8	NATURAL	Y	431	1975-2005	31	29.0	1003	2.41	0.01	0.361	1979	22.0%	10.9%	0.0%
08KA001	DORE RIVER NEAR MCBRIDE	13	NATURAL	Y	409	1915-2005	45	39.0	2002	14.29	0.03	2.144	1982	36.6%	33.6%	0.0%
08KA004	FRASER RIVER AT HANSARD	12	NATURAL	Y	18,000	1952-2005	53	52.0	1597	463.01	0.03	69.451	1977	40.8%	35.5%	0.0%
08KA005	FRASER RIVER AT MCBRIDE	13	NATURAL	Y	6,890	1953-2005	53	48.0	1881	197.13	0.03	29.569	1982	37.8%	33.7%	0.0%
08KA007	FRASER RIVER AT RED PASS	13	NATURAL	Y	1,710	1955-2005	51	50.0	2038	45.85	0.03	6.877	1992	35.8%	34.5%	0.0%
08KA008	MOOSE RIVER NEAR RED PASS	13	NATURAL	N	458	1955-1995	41	38.0	N/A	14.33	0.03	2.149	1982	35.6%	28.6%	0.0%
08KA009	MCKALE RIVER NEAR 940 M CONTOUR	13	NATURAL	Y	254	1971-2005	35	34.0	1919	8.37	0.03	1.255	1982	33.6%	27.8%	0.0%
08KA012	SWIFT CREEK NEAR THE MOUTH	13	NATURAL	N	132	1984-1998	15	14.0	1982	3.26	0.02	0.489	1992	29.7%	29.0%	0.0%
08KB001	FRASER RIVER AT SHELLEY	8	NATURAL	Y	32,400	1950-2005	56	55.0	1413	814.32	0.03	122.147	1977	42.3%	35.4%	0.0%
08KB003	MCGREGOR RIVER AT LOWER CANYON	12	NATURAL	Y	4,780	1959-2005	47	45.0	1502	217.38	0.05	32.608	1992	41.0%	29.6%	0.0%
08KB006	MULLER CREEK NEAR THE MOUTH	12	NATURAL	Y	103	1977-2005	28	25.9	1507	4.68	0.05	0.702	1992	36.4%	27.0%	0.0%
08KC001	SALMON RIVER NEAR PRINCE GEORGE	8	NATURAL	Y	4,230	1953-2005	53	45.0	996	29.39	0.01	4.409	1979	26.8%	12.2%	0.0%
08KC003	MUSKEG RIVER NORTH OF JOANNE LAKE	8	NATURAL	N	303	1975-1998	22	21.0	1001	2.06	0.01	0.309	1988	24.1%	16.9%	0.0%
08KD001	BOWRON RIVER NEAR WELLS	14	NATURAL	N	458	1953-1995	43	32.8	N/A	9.10	0.02	1.365	1979	40.4%	35.0%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /s/km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
08KD003	WILLOW RIVER NEAR WILLOW RIVER	8	NATURAL	N	3,110	1953-1975	23	22.0	N/A	47.23	0.02	7.085	1955	35.9%	22.9%	0.0%
08KD004	BOWRON RIVER NEAR HANSARD	12	NATURAL	N	3,550	1954-1976	23	16.0	N/A	75.43	0.02	11.314	1972	39.3%	30.8%	0.0%
08KD006	WILLOW RIVER ABOVE HAY CREEK	8	NATURAL	Y	2,860	1976-2005	27	27.0	1235	36.53	0.01	5.480	1977	34.7%	27.4%	0.0%
08KD007	BOWRON RIVER BELOW BOX CANYON	12	NATURAL	Y	3,420	1977-2005	29	28.0	1331	65.10	0.02	9.765	1977	39.1%	34.3%	0.0%
08KE009	COTTONWOOD RIVER NEAR CINEMA	15	NATURAL	N	1,910	1954-1999	46	34.0	1267	24.38	0.01	3.658	1986	32.0%	24.3%	0.0%
08KE014	NAVER CREEK AT HIXON	15	NATURAL	N	658	1956-1975	19	12.0	N/A	8.34	0.01	1.251	1968	31.1%	26.4%	0.0%
08KE015	CALE CREEK NEAR RED ROCK	15	NATURAL	N	188	1956-1974	19	15.0	N/A	1.48	0.01	0.221	1970	32.9%	15.8%	0.0%
08KE016	BAKER CREEK AT QUESNEL	15	NATURAL	Y	1,550	1963-2005	43	41.0	1211	4.84	0.00	0.726	1987	27.8%	8.2%	0.0%
08KE024	LITTLE SWIFT RIVER AT THE MOUTH	14	NATURAL	Y	127	1971-2005	35	33.0	1583	2.82	0.02	0.423	2002	31.6%	23.8%	0.0%
08KE032	TABOR CREEK ABOVE SWEDE CREEK	8	NATURAL	N	60	1981-1999	19	11.0	936	0.44	0.01	0.067	1986	29.3%	15.4%	0.0%
08KF001	NAZKO RIVER ABOVE MICHELLE CREEK	15	NATURAL	N	3,240	1964-1995	31	28.0	N/A	4.90	0.00	0.736	1988	26.4%	17.3%	0.0%
08KG001	WEST ROAD RIVER NEAR CINEMA	15	NATURAL	Y	12,400	1952-2005	54	35.0	1284	33.19	0.00	4.979	1987	34.8%	12.9%	0.0%
08KG003	BAEZAEO RIVER AT LOT 10262	15	NATURAL	N	992	1974-1995	22	21.0	N/A	2.36	0.00	0.354	1987	36.3%	16.9%	0.0%
08KH001	QUESNEL RIVER AT LIKELY	14	NATURAL	Y	5,930	1924-2005	82	71.9	1419	129.33	0.02	19.399	2002	42.6%	32.9%	0.0%
08KH003	CARIBOO RIVER BELOW KANGAROO CREEK	14	NATURAL	N	3,260	1926-1995	69	55.8	N/A	94.00	0.03	14.100	1944	40.4%	32.2%	0.0%
08KH006	QUESNEL RIVER NEAR QUESNEL	15	NATURAL	Y	11,500	1939-2005	67	60.0	1391	238.82	0.02	35.822	2002	42.7%	35.7%	0.0%
08KH010	HORSEFLY RIVER ABOVE MCKINLEY CREEK	16	NATURAL	Y	785	1955-2005	46	43.0	1627	19.63	0.03	2.945	2002	34.7%	22.1%	0.0%
08KH013	CARIBOO RIVER NEAR KEITHLEY CREEK	14	NATURAL	N	2,870	1961-1974	14	12.0	N/A	95.16	0.03	14.273	1969	39.2%	35.4%	0.0%
08KH014	MITCHELL RIVER AT OUTLET OF MITCHELL LAKE	14	NATURAL	N	245	1961-1982	22	17.0	N/A	12.18	0.05	1.827	1977	40.8%	36.8%	0.0%
08KH018	BARLOW CREEK NEAR QUESNEL	15	NATURAL	N	70	1963-1974	12	10.0	N/A	0.28	0.00	0.042	1967	24.2%	20.9%	0.0%
08KH019	MOFFAT CREEK NEAR HORSEFLY	16	NATURAL	Y	539	1964-2005	42	37.0	1348	3.37	0.01	0.506	2002	30.7%	16.7%	0.0%
08KH022	MACKAY RIVER AT THE MOUTH	16	NATURAL	N	144	1971-1985	15	13.0	N/A	4.57	0.03	0.686	1977	33.3%	31.2%	0.0%
08KH023	DRAGON CREEK ABOVE DRAGON LAKE	15	NATURAL	N	7	1971-1994	17	10.0	N/A	0.03	0.00	0.005	1979	27.3%	8.4%	0.0%
08LA001	CLEARWATER RIVER NEAR CLEARWATER STATION	16	NATURAL	Y	10,200	1914-2005	71	66.0	1479	224.04	0.02	33.606	1952	38.0%	31.0%	0.0%
08LA004	MURTLÉ RIVER ABOVE DAWSON FALLS	14	NATURAL	N	1,380	1926-1983	37	28.9	N/A	43.10	0.03	6.465	1969	35.4%	28.2%	0.0%
08LA007	CLEARWATER RIVER AT OUTLET OF CLEARWATER LAKE	14	NATURAL	N	2,950	1950-1995	46	37.0	N/A	134.78	0.05	20.216	1992	38.1%	35.5%	0.0%
08LA008	MAHOOD RIVER AT OUTLET OF MAHOOD LAKE	16	NATURAL	N	4,710	1950-1984	33	24.7	N/A	33.37	0.01	5.006	1978	32.6%	22.0%	0.0%
08LA013	CLEARWATER RIVER AT OUTLET OF HOBSON LAKE	14	NATURAL	N	904	1959-1983	25	23.0	N/A	45.10	0.05	6.765	1979	39.7%	40.6%	0.0%
08LA018	HOBSON CREEK BELOW BOIS GRENIER CREEK	14	NATURAL	N	162	1971-1984	13	12.0	N/A	7.90	0.05	1.185	1977	37.8%	31.5%	0.0%
08LB012	PAUL CREEK AT THE OUTLET OF PINANTAN LAKE	15	NATURAL	Y	56	1913-2005	30	26.0	1239	0.17	0.00	0.025	1979	32.2%	0.8%	0.0%
08LB020	BARRIERE RIVER AT THE MOUTH	16	NATURAL	Y	1,140	1915-2005	66	58.1	1398	14.68	0.01	2.202	1928	29.3%	17.2%	0.0%
08LB022	NORTH THOMPSON RIVER NEAR BARRIERE	16	NATURAL	N	17,700	1915-1959	45	40.0	N/A	392.68	0.02	58.903	1928	38.7%	30.2%	0.0%
08LB024	FISHTRAP CREEK NEAR MCLURE	15	NATURAL	Y	135	1915-2005	42	33.0	1388	0.78	0.01	0.117	1972	26.0%	15.0%	0.0%
08LB038	BLUE RIVER NEAR BLUE RIVER	14	NATURAL	Y	280	1926-2005	26	24.0	1633	10.95	0.04	1.643	1991	33.0%	27.8%	0.0%
08LB047	NORTH THOMPSON RIVER AT BIRCH ISLAND	16	NATURAL	Y	4,450	1960-2005	46	45.0	1648	150.55	0.03	22.582	1976	39.3%	37.5%	0.0%
08LB050	MANN CREEK NEAR BLACKPOOL	16	NATURAL	N	295	1927-1981	22	16.0	N/A	3.01	0.01	0.451	1978	27.6%	17.2%	0.0%
08LB064	NORTH THOMPSON RIVER AT MCLURE	15	NATURAL	Y	19,600	1958-2005	48	47.0	1489	429.35	0.02	64.402	2002	38.7%	30.1%	0.0%
08LB069	BARRIERE RIVER BELOW SPRAGUE CREEK	16	NATURAL	Y	624	1964-2005	41	40.0	1548	11.65	0.02	1.747	1978	29.4%	20.6%	0.0%
08LB076	HARPER CREEK NEAR THE MOUTH	16	NATURAL	Y	168	1973-2005	32	30.0	1749	4.07	0.02	0.610	1978	30.1%	22.0%	0.0%
08LC040	VANCE CREEK BELOW DEAFIES CREEK	23	NATURAL	Y	73	1970-2005	36	26.6	1204	0.48	0.01	0.072	1991	30.5%	16.2%	0.0%
08LD001	ADAMS RIVER NEAR SQUILAX	14	NATURAL	Y	3,080	1911-2005	95	77.5	1377	70.97	0.02	10.645	1928	41.4%	26.6%	0.0%
08LE024	EAGLE RIVER NEAR MALAKWA	14	NATURAL	Y	904	1913-2005	47	40.9	1494	38.24	0.04	5.736	1978	37.1%	29.3%	0.0%
08LE027	SEYMOUR RIVER NEAR SEYMOUR ARM	14	NATURAL	Y	806	1914-2005	54	38.5	1507	36.49	0.05	5.474	1978	36.7%	29.3%	0.0%
08LE031	SOUTH THOMPSON RIVER AT CHASE	15	NATURAL	Y	16,200	1911-2005	83	76.9	1315	293.07	0.02	43.960	1928	39.9%	21.1%	0.0%
08LE069	SOUTH THOMPSON RIVER AT MONTE CREEK	15	NATURAL	N	16,600	1958-1970	13	12.0	N/A	299.30	0.02	44.895	1969	41.1%	35.9%	0.0%
08LE077	CORNING CREEK NEAR SQUILAX	14	NATURAL	Y	26	1966-2005	28	23.9	1367	0.37	0.01	0.055	1991	25.7%	18.5%	0.0%
08LE086	RATCHFORD CREEK AT 600 M CONTOUR	14	NATURAL	N	253	1973-1984	12	11.0	N/A	11.23	0.04	1.685	1978	36.5%	30.2%	0.0%
08LE094	BOLEAN CREEK NEAR THE MOUTH	15	NATURAL	N	224	1974-1986	12	11.0	N/A	1.07	0.00	0.161	1978	27.7%	15.0%	0.0%
08LE108	EAST CANOE CREEK ABOVE DAM	14	NATURAL	Y	21	1983-2005	23	20.9	1178	0.11	0.01	0.017	2000	28.3%	12.1%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrywoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /s/km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
08LF022	THOMPSON RIVER AT SPENCES BRIDGE	17	NATURAL	N	54,600	1911-1951	40	36.0	N/A	743.47	0.01	111.521	1928	39.1%	29.0%	0.0%
08LF033	THOMPSON RIVER NEAR SAVONA	15	NATURAL	N	39,100	1926-1966	14	10.0	N/A	696.11	0.02	104.417	1928	39.7%	29.4%	0.0%
08LF043	THOMPSON RIVER NEAR WALHACHIN	17	NATURAL	N	40,900	1932-1948	17	15.0	N/A	673.33	0.02	101.000	1943	38.4%	34.6%	0.0%
08LF051	THOMPSON RIVER NEAR SPENCES BRIDGE	17	NATURAL	Y	54,900	1951-2005	55	54.0	1363	780.66	0.01	117.098	2002	39.2%	29.6%	0.0%
08LF080	FIFTYNINE CREEK NEAR CLINTON	15	NATURAL	N	36	1977-1996	19	16.0	N/A	0.05	0.00	0.007	1988	55.4%	32.1%	30.5%
08LF081	AMBUSTEN CREEK NEAR THE MOUTH	17	NATURAL	N	33	1977-1998	22	21.0	1642	0.02	0.00	0.003	1987	33.1%	4.7%	0.0%
08LF084	ANDERSON CREEK ABOVE DIVERSIONS	17	NATURAL	N	32	1978-1998	21	20.0	1832	0.09	0.00	0.013	1987	27.0%	18.9%	0.0%
08LG008	SPIUS CREEK NEAR CANFORD	25	NATURAL	Y	780	1911-2005	45	35.9	1493	10.04	0.01	1.507	1976	30.2%	18.0%	0.0%
08LG016	PENNASK CREEK NEAR QUILCHENA	24	NATURAL	Y	87	1920-2005	64	35.0	1794	0.73	0.01	0.110	2002	23.7%	13.9%	0.0%
08LG048	COLDWATER RIVER NEAR BROOKMERE	25	NATURAL	Y	316	1965-2005	41	38.9	1552	6.78	0.02	1.017	1976	29.9%	19.3%	0.0%
08LG055	BETHSAIDA CREEK ABOVE HIGHLAND VALLEY ROAD	17	NATURAL	N	16	1967-1985	19	17.0	N/A	0.04	0.00	0.007	1976	25.4%	6.6%	0.0%
08LG056	GUICHON CREEK ABOVE TUNKWA LAKE DIVERSION	17	NATURAL	Y	78	1967-2005	39	35.0	1533	0.13	0.00	0.019	1986	27.3%	13.0%	0.0%
08LG064	BEAK CREEK AT THE MOUTH	24	NATURAL	N	85	1982-2001	20	18.0	1572	0.47	0.01	0.071	1987	25.3%	13.8%	0.0%
08LG066	CHATAWAY CREEK NEAR THE MOUTH	17	NATURAL	N	32	1984-1998	15	15.0	1668	0.06	0.00	0.009	1986	22.6%	13.2%	0.0%
08MA001	CHILKO RIVER NEAR REDSTONE	15	NATURAL	Y	6,940	1927-2005	79	56.8	1756	88.58	0.01	13.287	1972	39.8%	31.5%	0.0%
08MA002	CHILKO RIVER AT OUTLET OF CHILKO LAKE	15	NATURAL	Y	2,110	1928-2005	78	48.6	1868	42.75	0.02	6.412	1972	40.9%	31.6%	0.0%
08MA003	TASEKO RIVER AT OUTLET OF TASEKO LAKES	15	NATURAL	Y	1,520	1929-2005	26	23.0	2128	37.26	0.02	5.589	1983	36.8%	28.7%	0.0%
08MA006	LINGFIELD CREEK NEAR THE MOUTH	15	NATURAL	Y	98	1974-2005	32	31.0	1888	0.76	0.01	0.115	1997	23.5%	16.9%	0.0%
08MB005	CHILCOTIN RIVER BELOW BIG CREEK	15	NATURAL	Y	19,300	1970-2005	36	35.0	1528	102.14	0.01	15.320	1972	40.6%	35.2%	0.0%
08MB006	BIG CREEK ABOVE GROUNDHOG CREEK	15	NATURAL	Y	1,020	1974-2005	32	31.0	1961	5.98	0.01	0.896	1983	34.3%	25.4%	0.0%
08MB007	BIG CREEK BELOW GRAVEYARD CREEK	15	NATURAL	Y	232	1974-2005	32	31.0	2252	2.74	0.01	0.412	1983	34.8%	27.6%	0.0%
08ME004	BRIDGE RIVER AT LAJOIE FALLS	15	NATURAL	N	956	1924-1948	25	21.8	N/A	44.48	0.05	6.672	1942	36.7%	34.3%	0.0%
08ME005	BRIDGE RIVER NEAR GOLD BRIDGE	15	NATURAL	N	1,650	1924-1941	18	16.0	N/A	66.83	0.04	10.024	1928	37.9%	32.6%	0.0%
08ME014	BRIDGE RIVER BELOW TYAUGHTON CREEK	15	NATURAL	N	3,190	1929-1941	13	11.0	N/A	89.64	0.03	13.446	1935	39.1%	36.8%	0.0%
08ME025	YALAKOM RIVER ABOVE ORE CREEK	15	NATURAL	Y	575	1983-2005	23	23.0	1922	4.32	0.01	0.648	2000	39.3%	30.6%	0.0%
08MF003	COQUIHALLA RIVER NEAR HOPE	26	NATURAL	N	741	1911-1983	38	33.0	N/A	32.93	0.04	4.939	1914	39.4%	22.8%	0.0%
08MF006	WAHLEACH CREEK NEAR LAIDLAW (UPPER STATION)	26	NATURAL	N	65	1911-1951	18	14.0	N/A	4.62	0.07	0.693	1914	48.0%	32.1%	4.0%
08MF062	COQUIHALLA RIVER BELOW NEEDLE CREEK	25	NATURAL	Y	86	1965-2005	40	35.0	1513	3.32	0.04	0.498	2000	34.0%	22.3%	0.0%
08MF065	NAHATLATCH RIVER BELOW TACHEWANA CREEK	25	NATURAL	Y	715	1973-2005	32	26.9	1607	35.33	0.05	5.300	1978	38.2%	31.0%	0.0%
08MF068	COQUIHALLA RIVER ABOVE ALEXANDER CREEK	26	NATURAL	Y	720	1987-2005	18	16.0	1323	30.08	0.04	4.512	2002	42.1%	31.6%	0.0%
08MG001	CHEHALIS RIVER NEAR HARRISON MILLS	27	NATURAL	Y	383	1911-2005	35	24.9	952	38.82	0.10	5.823	1992	41.1%	29.2%	0.0%
08MG003	GREEN RIVER NEAR PEMBERTON	26	NATURAL	N	855	1913-1951	39	34.9	N/A	48.22	0.06	7.234	1925	43.0%	29.9%	0.0%
08MG004	GREEN RIVER NEAR RAINBOW	26	NATURAL	N	195	1914-1948	28	26.0	N/A	8.28	0.04	1.241	1925	41.4%	27.0%	0.0%
08MG005	LILLOET RIVER NEAR PEMBERTON	25	NATURAL	Y	2,160	1914-2005	87	79.0	1678	125.03	0.06	18.755	2000	41.0%	36.4%	0.0%
08MG006	RUTHERFORD CREEK NEAR PEMBERTON	26	NATURAL	N	179	1914-1948	27	23.0	N/A	11.56	0.06	1.734	1928	39.9%	33.9%	0.0%
08MG007	SOO RIVER NEAR PEMBERTON	26	NATURAL	N	283	1915-1948	26	23.0	N/A	18.99	0.07	2.849	1943	42.8%	35.7%	0.0%
08MG008	BIRKENHEAD RIVER AT MOUNT CURRIE	25	NATURAL	N	596	1945-1971	27	22.1	N/A	23.38	0.04	3.508	1946	39.3%	32.8%	0.0%
08MG013	HARRISON RIVER NEAR HARRISON HOT SPRINGS	26	NATURAL	Y	7,870	1951-2005	55	53.0	1410	442.04	0.06	66.306	1969	48.5%	33.7%	0.0%
08MH001	CHILLIWACK RIVER AT VEDDER CROSSING	27	NATURAL	Y	1,230	1911-2005	76	68.9	N/A	66.58	0.05	9.987	2000	46.0%	25.4%	0.0%
08MH006	NORTH ALOUETTE RIVER AT 232ND STREET - MAPLE RIDGE	27	NATURAL	Y	37	1911-2005	49	46.9	682	2.82	0.08	0.424	1978	33.6%	21.0%	0.0%
08MH016	CHILLIWACK RIVER AT OUTLET OF CHILLIWACK LAKE	26	NATURAL	Y	329	1923-2005	78	73.0	N/A	19.07	0.06	2.860	2000	45.5%	22.5%	0.0%
08MH017	PITT RIVER NEAR ALVIN	26	NATURAL	N	515	1952-1965	14	10.7	N/A	54.57	0.11	8.185	1960	45.0%	35.5%	0.0%
08MH018	MAHOOD CREEK NEAR NEWTON	27	NATURAL	N	18	1926-1986	30	21.8	N/A	0.54	0.03	0.081	1976	29.8%	18.9%	0.0%
08MH020	MAHOOD CREEK NEAR SULLIVAN	27	NATURAL	N	34	1926-1980	31	22.5	N/A	1.15	0.03	0.173	1957	31.8%	20.8%	27.2%
08MH029	SUMAS RIVER NEAR HUNTINGDON	27	NATURAL	Y	149	1952-2005	53	49.0	N/A	3.27	0.02	0.491	1957	41.3%	14.9%	40.1%
08MH056	SLESSE CREEK NEAR VEDDER CROSSING	26	NATURAL	Y	162	1957-2005	49	44.7	N/A	10.14	0.06	1.521	2000	43.6%	29.1%	0.0%
08MH076	KANAKA CREEK NEAR WEBSTER CORNERS	27	NATURAL	Y	48	1960-2005	46	42.8	460	2.72	0.06	0.408	2000	35.1%	24.4%	0.0%
08MH097	YORKSON CREEK NEAR WALNUT GROVE	27	NATURAL	N	6	1960-1978	19	13.0	N/A	0.15	0.02	0.022	1976	27.7%	17.5%	23.8%
08MH103	CHILLIWACK RIVER ABOVE SLESSE CREEK	26	NATURAL	Y	645	1963-2005	43	42.0	N/A	35.41	0.05	5.311	2000	45.4%	22.5%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
08MH104	ANDERSON CREEK AT THE MOUTH	27	NATURAL	N	27	1965-1987	23	21.0	N/A	0.69	0.03	0.104	1978	32.7%	19.6%	28.9%
08MH105	NICOMEKL RIVER BELOW MURRAY CREEK	27	NATURAL	N	65	1965-1984	20	18.0	N/A	1.83	0.03	0.275	1978	29.3%	19.2%	0.0%
08MH108	JACOBS CREEK ABOVE JACOBS LAKE	27	NATURAL	N	12	1965-1979	15	11.0	N/A	0.96	0.08	0.144	1976	33.4%	24.4%	0.0%
08MH129	MURRAY CREEK AT 216 STREET - LANGLEY	27	NATURAL	N	26	1969-1983	15	12.8	N/A	0.59	0.02	0.088	1976	27.4%	19.9%	0.0%
08MH141	COQUITLAM RIVER ABOVE COQUITLAM LAKE	27	NATURAL	Y	55	1982-2005	24	23.0	1154	6.58	0.12	0.987	1992	37.2%	28.3%	0.0%
08MH147	STAVE RIVER ABOVE STAVE LAKE	27	NATURAL	Y	282	1983-2005	23	19.9	1397	33.78	0.12	5.068	1992	42.6%	33.3%	0.0%
08MH155	NICOMEKL RIVER AT 203 STREET - LANGLEY	27	NATURAL	Y	69	1985-2005	21	20.9	250	1.94	0.03	0.291	2000	30.4%	23.4%	21.3%
08NA001	BUGABOO CREEK NEAR SPILLIMACHEEN	18	NATURAL	N	381	1912-1956	20	13.0	N/A	9.93	0.03	1.489	1951	34.4%	35.3%	0.0%
08NA002	COLUMBIA RIVER AT NICHOLSON	18	NATURAL	Y	6,660	1903-2005	102	86.9	1878	107.22	0.02	16.084	1943	36.4%	31.9%	0.0%
08NA006	KICKING HORSE RIVER AT GOLDEN	18	NATURAL	Y	1,850	1911-2005	44	35.0	2062	40.80	0.02	6.119	1974	35.7%	31.3%	0.0%
08NA012	TOBY CREEK NEAR ATHALMER	18	NATURAL	N	684	1912-1984	23	12.0	N/A	12.63	0.02	1.894	1944	34.1%	29.6%	0.0%
08NA020	STODDART CREEK NEAR ATHALMER	18	NATURAL	N	21	1938-1982	16	10.0	N/A	0.12	0.01	0.018	1976	45.8%	30.7%	0.0%
08NA024	WINDERMERE CREEK NEAR WINDERMERE	18	NATURAL	N	84	1914-1979	41	20.0	N/A	0.59	0.01	0.089	1962	52.3%	43.5%	31.5%
08NA045	COLUMBIA RIVER NEAR FAIRMONT HOT SPRINGS	19	NATURAL	N	891	1944-1996	53	50.9	N/A	10.40	0.01	1.560	1976	34.1%	25.0%	0.0%
08NB005	COLUMBIA RIVER AT DONALD	18	NATURAL	Y	9,710	1944-2005	62	59.0	1905	171.75	0.02	25.762	2000	36.6%	30.3%	0.0%
08NB006	COLUMBIA RIVER AT SURPRISE RAPIDS	18	NATURAL	N	14,000	1948-1966	19	15.0	N/A	336.81	0.02	50.521	1952	36.5%	35.0%	0.0%
08NB012	BLAEBERRY RIVER ABOVE WILLOWBANK CREEK	18	NATURAL	Y	588	1970-2005	36	33.0	2084	16.71	0.03	2.507	1992	37.4%	36.1%	0.0%
08NB013	GOLD RIVER ABOVE BACHELOR CREEK	18	NATURAL	N	135	1974-1995	22	21.0	N/A	6.88	0.05	1.032	1978	35.0%	34.8%	0.0%
08NB014	GOLD RIVER ABOVE PALMER CREEK	18	NATURAL	Y	427	1973-2005	33	33.0	2154	18.28	0.04	2.741	1992	35.5%	35.3%	0.0%
08NB015	BLAEBERRY RIVER BELOW ENSIGN CREEK	18	NATURAL	N	230	1974-1996	23	22.0	N/A	7.51	0.03	1.127	1987	36.6%	36.6%	0.0%
08NB016	SPLIT CREEK AT THE MOUTH	18	NATURAL	Y	81	1974-2005	32	32.0	2109	1.65	0.02	0.248	1983	35.7%	30.6%	0.0%
08NB019	BEAVER RIVER NEAR THE MOUTH	18	NATURAL	Y	1,150	1985-2005	21	21.0	1992	41.71	0.04	6.257	1992	37.4%	34.6%	0.0%
08NC001	WOOD RIVER NEAR DONALD	18	NATURAL	N	956	1948-1972	17	11.9	N/A	40.23	0.04	6.034	1950	36.8%	34.0%	0.0%
08NC004	CANOE RIVER BELOW KIMMEL CREEK	13	NATURAL	Y	298	1971-2005	34	31.0	2050	14.59	0.05	2.188	1974	36.9%	34.7%	0.0%
08ND006	COLUMBIA RIVER AT TWELVE MILE FERRY	22	NATURAL	N	28,500	1948-1968	21	19.0	N/A	929.59	0.03	139.438	1952	37.5%	36.8%	0.0%
08ND009	DOWNIE CREEK NEAR REVELSTOKE	22	NATURAL	N	655	1953-1983	31	23.9	N/A	30.31	0.05	4.546	1972	38.2%	32.4%	0.0%
08ND012	GOLDSTREAM RIVER BELOW OLD CAMP CREEK	22	NATURAL	Y	938	1954-2005	47	41.9	1770	39.09	0.04	5.863	1992	37.4%	32.8%	0.0%
08ND013	ILLECILLEWAET RIVER AT GREELEY	22	NATURAL	Y	1,150	1963-2005	43	42.0	1843	53.13	0.05	7.970	1992	37.8%	32.7%	0.0%
08ND014	JORDAN RIVER ABOVE KIRKUP CREEK	14	NATURAL	N	272	1963-1988	26	25.0	N/A	17.28	0.06	2.591	1978	35.3%	31.5%	0.0%
08ND018	STITT CREEK AT THE MOUTH	22	NATURAL	N	139	1973-1998	26	26.0	2041	6.88	0.05	1.032	1976	37.0%	27.7%	0.0%
08ND019	KIRBYVILLE CREEK NEAR THE MOUTH	14	NATURAL	Y	112	1973-2005	33	33.0	1755	6.14	0.05	0.922	1976	39.2%	37.4%	0.0%
08NE001	INCAMAPLEUX RIVER NEAR BEATON	22	NATURAL	N	1,020	1914-1996	47	43.0	N/A	55.83	0.05	8.375	1972	38.7%	33.1%	0.0%
08NE006	KUSKANAX CREEK NEAR NAKUSP	22	NATURAL	Y	337	1914-2005	44	42.9	1761	14.05	0.04	2.108	2000	31.0%	24.7%	0.0%
08NE008	BEATON CREEK NEAR BEATON	22	NATURAL	Y	100	1952-2005	53	48.0	1601	2.74	0.03	0.411	1992	37.4%	24.5%	0.0%
08NE021	BROUSE CREEK ABOVE DIVERSIONS	22	NATURAL	N	1	1923-1986	25	10.0	N/A	0.02	0.02	0.003	1978	47.8%	39.3%	25.3%
08NE039	BIG SHEEP CREEK NEAR ROSSLAND	23	NATURAL	Y	347	1929-2005	59	56.0	1507	5.61	0.02	0.842	2000	27.5%	15.1%	0.0%
08NE074	SALMO RIVER NEAR SALMO	22	NATURAL	Y	1,230	1949-2005	57	56.0	N/A	31.78	0.03	4.767	2000	30.2%	15.8%	0.0%
08NE077	BARNES CREEK NEAR NEEDLES	22	NATURAL	Y	201	1950-2005	56	55.0	1569	4.02	0.02	0.602	1986	26.5%	18.0%	0.0%
08NE087	DEER CREEK AT DEER PARK	22	NATURAL	Y	81	1958-2005	48	45.0	1489	0.88	0.01	0.132	1987	29.2%	21.0%	0.0%
08NE110	INONOAKLIN CREEK ABOVE VALLEY CREEK	23	NATURAL	Y	298	1971-2005	31	29.0	1558	3.85	0.01	0.577	2000	26.8%	19.8%	0.0%
08NE113	KELLY CREEK AT 850 M CONTOUR	22	NATURAL	N	23	1971-1982	12	11.0	N/A	0.42	0.02	0.062	1976	27.2%	15.4%	0.0%
08NE114	HIDDEN CREEK NEAR THE MOUTH	22	NATURAL	Y	57	1973-2005	33	32.0	1660	1.60	0.03	0.240	1976	31.6%	17.3%	0.0%
08NE117	KUSKANAX CREEK AT 1040 M CONTOUR	22	NATURAL	N	113	1973-1996	24	22.0	N/A	5.35	0.05	0.802	1976	29.5%	26.3%	0.0%
08NF001	KOOTENAY RIVER AT KOOTENAY CROSSING	18	NATURAL	Y	420	1939-2005	65	55.9	1861	4.92	0.01	0.738	1948	31.3%	17.9%	0.0%
08NF002	KOOTENAY RIVER AT CANAL FLATS	19	NATURAL	N	5,390	1939-1995	45	36.0	N/A	88.01	0.02	13.201	1948	34.1%	25.1%	0.0%
08NF005	ALBERT RIVER AT 1310 M CONTOUR	18	NATURAL	N	70	1972-1999	28	26.0	2177	1.59	0.02	0.239	1978	28.9%	21.6%	0.0%
08NF006	PALLISER RIVER IN LOT SL49	18	NATURAL	N	653	1973-1995	23	22.0	N/A	14.85	0.02	2.228	1976	34.0%	32.9%	0.0%
08NG005	KOOTENAY RIVER AT WARDNER	20	NATURAL	N	13,600	1914-1972	59	54.0	N/A	205.07	0.02	30.761	1925	33.5%	25.5%	0.0%
08NG012	ST. MARY RIVER AT WYCLIFFE	20	NATURAL	N	2,360	1914-1995	54	45.9	N/A	51.20	0.02	7.680	1976	28.8%	22.4%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /s/km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
08NG042	KOOTENAY RIVER AT NEWGATE	20	NATURAL	N	20,000	1930-1972	43	41.0	N/A	298.08	0.01	44.713	1943	33.1%	21.0%	0.0%
08NG046	ST. MARY RIVER NEAR MARYSVILLE	20	NATURAL	N	1,480	1945-1995	50	47.0	N/A	40.37	0.03	6.055	1976	29.7%	23.7%	0.0%
08NG051	SKOOKUMCHUCK CREEK NEAR SKOOKUMCHUCK	20	NATURAL	N	637	1949-1984	29	26.0	N/A	10.57	0.02	1.585	1976	28.6%	18.5%	0.0%
08NG053	KOOTENAY RIVER NEAR SKOOKUMCHUCK	20	NATURAL	N	7,120	1950-1996	47	45.0	N/A	113.12	0.02	16.967	1969	33.8%	26.3%	0.0%
08NG065	KOOTENAY RIVER AT FORT STEELE	20	NATURAL	Y	11,400	1963-2005	43	42.0	1882	172.37	0.02	25.855	2000	33.4%	23.0%	0.0%
08NG076	MATHER CREEK BELOW HOULE CREEK	20	NATURAL	Y	136	1972-2005	34	33.0	1750	1.25	0.01	0.187	2000	29.5%	10.7%	0.0%
08NG077	ST. MARY RIVER BELOW MORRIS CREEK	20	NATURAL	Y	206	1973-2005	33	33.0	1991	7.11	0.03	1.066	1976	30.8%	25.1%	0.0%
08NG078	CAVEN CREEK BELOW BLOOM CREEK	20	NATURAL	N	313	1972-1995	24	22.0	N/A	2.18	0.01	0.327	1976	29.9%	11.6%	0.0%
08NH001	DUNCAN RIVER NEAR HOWSER	21	NATURAL	N	2,160	1915-1967	39	36.0	N/A	91.25	0.04	13.687	1943	37.9%	34.2%	0.0%
08NH005	KASLO RIVER BELOW KEMP CREEK	21	NATURAL	Y	453	1914-2005	49	45.0	1872	13.24	0.03	1.986	2000	32.6%	22.9%	0.0%
08NH007	LARDEAU RIVER AT MARBLEHEAD	21		Y	1,620	1917-2005	59	54.0	N/A	58.83	0.04	8.824	1992	35.6%	29.5%	0.0%
08NH016	DUCK CREEK NEAR WYNNDDEL	21	NATURAL	Y	57	1921-2005	41	34.0	1624	0.95	0.02	0.143	2000	37.8%	16.5%	0.0%
08NH034	MOYIE RIVER AT MOYIE	20	NATURAL	N	725	1944-1970	27	23.9	N/A	9.28	0.01	1.392	1957	24.7%	16.9%	0.0%
08NH051	ARGENTA CREEK NEAR ARGENTA	21	NATURAL	N	6	1928-1986	19	11.0	N/A	0.06	0.01	0.010	1976	46.2%	35.6%	0.0%
08NH066	LARDEAU RIVER AT GERRARD	22	NATURAL	N	769	1934-1956	23	20.0	N/A	26.01	0.03	3.902	1943	35.7%	28.9%	0.0%
08NH084	ARROW CREEK NEAR ERICKSON	21	NATURAL	Y	79	1945-2005	50	43.8	1653	1.72	0.02	0.258	2000	28.5%	15.8%	0.0%
08NH115	SULLIVAN CREEK NEAR CANYON	21	NATURAL	Y	6	1958-2005	44	39.0	1690	0.06	0.01	0.009	2000	31.3%	14.0%	0.0%
08NH119	DUNCAN RIVER BELOW B.B. CREEK	21	NATURAL	Y	1,330	1962-2005	44	42.0	2015	62.27	0.05	9.340	2000	36.7%	32.5%	0.0%
08NH120	MOYIE RIVER ABOVE NEGRO CREEK	20	NATURAL	Y	240	1964-2005	42	41.0	1815	4.79	0.02	0.718	2000	24.4%	14.1%	0.0%
08NH130	FRY CREEK BELOW CARNEY CREEK	21	NATURAL	Y	461	1973-2005	32	32.0	2133	18.89	0.04	2.834	2000	33.8%	25.9%	0.0%
08NH131	CARNEY CREEK BELOW PAMBRUN CREEK	21	NATURAL	Y	118	1973-2004	32	30.0	2285	4.52	0.04	0.678	2000	33.7%	29.7%	0.0%
08NH132	KEEN CREEK BELOW KYAWATS CREEK	21	NATURAL	Y	92	1973-2005	33	32.0	2080	3.33	0.04	0.499	2000	32.0%	23.9%	0.0%
08NJ013	SLOCAN RIVER NEAR CRESCENT VALLEY	22	NATURAL	Y	3,320	1914-2005	83	80.0	1672	89.00	0.03	13.350	1943	34.1%	21.9%	0.0%
08NJ014	SLOCAN RIVER AT SLOCAN CITY	22	NATURAL	N	1,660	1916-1968	32	28.0	N/A	53.92	0.03	8.088	1948	34.4%	27.3%	0.0%
08NJ026	DUHAMEL CREEK ABOVE DIVERSIONS	21	NATURAL	Y	53	1922-2005	14	10.0	1668	1.51	0.03	0.226	2000	32.9%	16.1%	0.0%
08NJ061	REDFISH CREEK NEAR HARROP	21	NATURAL	Y	26	1967-2005	34	31.0	1831	0.86	0.03	0.129	1976	26.6%	18.6%	0.0%
08NJ112	GOOSE CREEK NEAR CRESCENT VALLEY	22	NATURAL	N	84	1932-1981	14	10.0	N/A	1.55	0.02	0.232	1978	29.9%	17.5%	0.0%
08NJ129	FELL CREEK NEAR NELSON	21	NATURAL	N	4	1945-1996	37	29.0	N/A	0.06	0.01	0.010	1976	29.1%	19.8%	0.0%
08NJ130	ANDERSON CREEK NEAR NELSON	21	NATURAL	Y	9	1945-2005	46	39.0	1592	0.11	0.01	0.017	1976	29.3%	17.7%	0.0%
08NJ160	LEMON CREEK ABOVE SOUTH LEMON CREEK	22	NATURAL	Y	178	1973-2005	32	32.0	1789	4.69	0.03	0.704	2000	30.4%	20.6%	0.0%
08NJ162	SMOKY CREEK ABOVE DIVERSIONS	22	NATURAL	N	6	1981-1993	13	11.0	N/A	0.05	0.01	0.007	1987	31.5%	21.0%	0.0%
08NJ168	FIVE MILE CREEK ABOVE CITY INTAKE	21	NATURAL	Y	48	1983-2005	23	22.0	1881	1.15	0.02	0.173	2000	25.8%	16.6%	0.0%
08NK002	ELK RIVER AT FERNIE	20	NATURAL	Y	3,110	1925-2005	39	37.0	1998	46.87	0.02	7.031	2000	34.6%	19.4%	0.0%
08NK012	ELK RIVER AT STANLEY PARK	20	NATURAL	N	3,520	1944-1969	26	25.0	N/A	63.70	0.02	9.555	1948	32.0%	22.0%	0.0%
08NK016	ELK RIVER NEAR NATAL	19	NATURAL	Y	1,870	1950-2005	56	52.0	2090	26.42	0.01	3.963	2000	32.7%	20.1%	0.0%
08NK018	FORDING RIVER AT THE MOUTH	19	NATURAL	Y	619	1970-2005	36	36.0	2110	7.98	0.01	1.196	2000	31.3%	16.9%	0.0%
08NK019	GRAVE CREEK AT THE MOUTH	19	NATURAL	N	84	1970-1999	30	29.0	1877	1.09	0.01	0.163	1976	32.1%	25.7%	0.0%
08NK020	MICHEL CREEK BELOW NATAL	20	NATURAL	N	637	1970-1996	27	25.0	N/A	10.78	0.02	1.617	1976	26.3%	15.9%	0.0%
08NK021	FORDING RIVER BELOW CLODE CREEK	19	NATURAL	N	104	1971-1995	24	22.0	N/A	1.74	0.02	0.261	1987	29.8%	21.0%	0.0%
08NK022	LINE CREEK AT THE MOUTH	19	NATURAL	Y	138	1971-2005	35	34.0	2110	2.11	0.02	0.316	2000	31.5%	14.7%	0.0%
08NK026	HOSMER CREEK ABOVE DIVERSIONS	20	NATURAL	Y	6	1981-2005	25	22.0	1784	0.12	0.02	0.018	2000	28.5%	18.4%	0.0%
08NK027	ELK RIVER BELOW WEARY CREEK	19	NATURAL	N	334	1982-1996	15	14.0	N/A	6.67	0.02	1.001	1983	35.3%	30.4%	0.0%
08NL004	ASHNOLA RIVER NEAR KEREMEOS	24	NATURAL	Y	1,050	1914-2005	64	58.7	N/A	7.76	0.01	1.164	2000	25.2%	16.9%	0.0%
08NL006	SIMILKAMEEN RIVER NEAR KEREMEOS	24	NATURAL	N	5,960	1914-1932	19	14.5	N/A	53.35	0.01	8.003	1925	26.8%	13.9%	0.0%
08NL007	SIMILKAMEEN RIVER AT PRINCETON	24	NATURAL	Y	1,850	1914-2005	71	63.8	N/A	24.01	0.01	3.601	2000	26.6%	12.3%	0.0%
08NL024	TULAMEEN RIVER AT PRINCETON	24	NATURAL	Y	1,760	1950-2005	56	53.9	1475	22.12	0.01	3.318	2000	27.3%	16.0%	0.0%
08NL035	SOUKUP CREEK NEAR HEDLEY	24	NATURAL	N	22	1964-1979	16	12.0	N/A	0.04	0.00	0.006	1969	27.8%	11.9%	0.0%
08NL036	WHIPSAW CREEK BELOW LAMONT CREEK	24	NATURAL	N	185	1964-1998	35	34.0	1553	1.04	0.01	0.156	1976	25.4%	13.2%	0.0%
08NL037	TREHEARNE CREEK NEAR PRINCETON	24	NATURAL	N	16	1964-1979	16	13.9	N/A	0.02	0.00	0.003	1969	12.9%	5.6%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\Libra25.burnaby.kerrwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT

FOR BRITISH COLUMBIA 2010 UPDATE

FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /s/km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
08NL038	SIMILKAMEEN RIVER NEAR HEDLEY	24	NATURAL	Y	5,590	1965-2005	41	40.0	N/A	48.10	0.01	7.215	2000	28.0%	15.8%	0.0%
08NL041	WOLFE CREEK AT OUTLET OF ISSITZ LAKE	24	NATURAL	N	215	1968-1981	14	12.0	N/A	0.49	0.00	0.074	1969	26.2%	10.4%	0.0%
08NL050	HEDLEY CREEK NEAR THE MOUTH	24	NATURAL	Y	389	1973-2005	32	32.0	1780	2.40	0.01	0.360	1991	26.1%	12.9%	0.0%
08NL069	PASAYTEN RIVER ABOVE CALCITE CREEK	24	NATURAL	Y	562	1975-2005	31	31.0	N/A	7.75	0.01	1.162	2000	28.7%	14.2%	0.0%
08NL070	SIMILKAMEEN RIVER ABOVE GOODFELLOW CREEK	24	NATURAL	Y	407	1974-2005	32	30.0	N/A	7.60	0.02	1.140	2000	28.5%	14.7%	0.0%
08NL071	TULAMEEN RIVER BELOW VUICH CREEK	25	NATURAL	Y	256	1974-2005	32	31.0	1675	6.49	0.03	0.973	2000	28.7%	18.2%	0.0%
08NM015	VASEUX CREEK ABOVE DUTTON CREEK	24	NATURAL	N	255	1919-1982	29	21.9	N/A	1.40	0.01	0.210	1972	20.9%	12.9%	0.0%
08NM035	BELLEVUE CREEK NEAR OKANAGAN MISSION	24	NATURAL	N	73	1920-1986	29	17.0	N/A	0.39	0.01	0.059	1976	19.7%	14.3%	0.0%
08NM133	BULL CREEK NEAR CRUMP	24	NATURAL	N	47	1965-1986	22	18.9	N/A	0.14	0.00	0.020	1969	21.9%	9.9%	0.0%
08NM134	CAMP CREEK AT MOUTH NEAR THIRSK	24	NATURAL	Y	34	1965-2005	41	39.0	1572	0.15	0.00	0.023	1987	26.5%	15.6%	0.0%
08NM137	DAVES CREEK NEAR RUTLAND	15	NATURAL	N	31	1965-1986	22	19.0	N/A	0.12	0.00	0.017	1969	25.6%	8.8%	0.0%
08NM142	COLDSTREAM CREEK ABOVE MUNICIPAL INTAKE	23	NATURAL	Y	59	1967-2005	39	37.0	1254	0.25	0.00	0.038	1969	27.9%	11.9%	0.0%
08NM146	CLARK CREEK NEAR WINFIELD	15	NATURAL	N	15	1968-1982	15	14.0	N/A	0.08	0.01	0.012	1969	21.7%	9.2%	0.0%
08NM164	TESTALINDEN CREEK IN CANYON	24	NATURAL	N	13	1969-1986	18	14.1	N/A	0.03	0.00	0.004	1978	25.8%	6.0%	0.0%
08NM171	VASEUX CREEK ABOVE SOLCO CREEK	24	NATURAL	Y	117	1970-2005	36	35.0	1829	0.92	0.01	0.138	1972	23.7%	11.1%	0.0%
08NM172	PEARSON CREEK NEAR THE MOUTH	23	NATURAL	N	74	1970-1987	18	16.0	N/A	0.97	0.01	0.146	1972	26.6%	15.8%	0.0%
08NM173	GREATA CREEK NEAR THE MOUTH	24	NATURAL	Y	41	1970-2005	36	35.0	1435	0.08	0.00	0.012	1987	27.1%	2.7%	0.0%
08NM174	WHITEMAN CREEK ABOVE BOULEAU CREEK	15	NATURAL	Y	112	1971-2005	35	34.0	1532	0.63	0.01	0.095	1991	24.0%	14.8%	0.0%
08NM176	EWER CREEK NEAR THE MOUTH	15	NATURAL	N	53	1971-1986	16	14.0	N/A	0.37	0.01	0.055	1976	22.8%	15.4%	0.0%
08NM240	TWO FORTY CREEK NEAR PENTICTON	24	NATURAL	Y	5	1983-2005	23	22.0	1870	0.06	0.01	0.009	1991	22.2%	16.4%	0.0%
08NM241	TWO FORTY-ONE CREEK NEAR PENTICTON	24	NATURAL	Y	5	1983-2005	23	22.0	1874	0.06	0.01	0.008	1991	22.1%	19.0%	0.0%
08NM242	DENNIS CREEK NEAR 1780 METRE CONTOUR	24	NATURAL	Y	4	1985-2005	21	21.0	2055	0.05	0.01	0.008	1986	22.2%	15.9%	0.0%
08NN002	GRANBY RIVER AT GRAND FORKS	23	NATURAL	Y	2,050	1914-2005	48	42.0	1496	30.79	0.02	4.619	2000	29.1%	17.3%	0.0%
08NN015	WEST KETTLE RIVER NEAR MCCULLOCH	23	NATURAL	Y	230	1949-2005	51	40.0	1762	3.49	0.02	0.523	1986	25.5%	16.7%	0.0%
08NN019	TRAPPING CREEK NEAR THE MOUTH	23	NATURAL	Y	144	1965-2005	41	40.0	1508	1.47	0.01	0.220	1987	26.5%	19.7%	0.0%
08NN020	TRAPPING CREEK AT 1220 M CONTOUR	23	NATURAL	N	23	1970-1981	12	11.0	N/A	0.49	0.02	0.073	1976	22.8%	16.7%	0.0%
08NN021	MOODY CREEK NEAR CHRISTINA	23	NATURAL	N	14	1971-1984	14	13.0	N/A	0.14	0.01	0.021	1976	26.4%	12.3%	0.0%
08NN022	WEST KETTLE RIVER BELOW CARMICHAEL CREEK	23	NATURAL	N	1,170	1973-1996	24	21.0	N/A	9.65	0.01	1.448	1987	27.4%	20.8%	0.0%
08NN023	BURRELL CREEK ABOVE GLOUCESTER CREEK	22	NATURAL	Y	224	1974-2005	32	32.0	1596	4.33	0.02	0.650	2000	28.0%	17.8%	0.0%
08NP001	FLATHEAD RIVER AT FLATHEAD	20	NATURAL	Y	1,110	1929-2004	68	44.0	N/A	25.79	0.02	3.868	1976	27.2%	14.6%	0.0%
08NP002	COULDREY CREEK IN LOT 9380	20	NATURAL	N	118	1974-1992	19	18.0	N/A	2.46	0.02	0.369	1976	29.1%	17.1%	0.0%
08NP003	HOWELL CREEK ABOVE CABIN CREEK	20	NATURAL	N	145	1977-1996	20	18.0	N/A	2.76	0.02	0.414	1991	31.8%	23.5%	0.0%
08NP004	CABIN CREEK NEAR THE MOUTH	20	NATURAL	Y	93	1977-2005	29	28.0	1919	1.94	0.02	0.290	2000	27.2%	17.1%	0.0%
08OA002	YAKOUN RIVER NEAR PORT CLEMENTS	11	NATURAL	Y	477	1962-2005	43	39.0	356	31.04	0.07	4.657	1994	39.1%	31.9%	21.1%
08OB002	PALLANT CREEK NEAR QUEEN CHARLOTTE	11	NATURAL	Y	77	1962-2005	41	32.8	397	8.25	0.11	1.237	1981	43.2%	34.7%	25.6%
08PA001	SKAGIT RIVER NEAR HOPE	26	NATURAL	N	907	1915-1955	30	25.0	N/A	28.32	0.03	4.249	1940	35.6%	16.1%	0.0%
09AA010	LINDEMAN CREEK NEAR BENNETT	2	NATURAL	N	240	1954-1993	40	33.9	N/A	10.02	0.04	1.503	1973	37.2%	35.0%	0.0%
09AA014	FANTAIL RIVER AT OUTLET OF FANTAIL LAKE	2	NATURAL	N	717	1956-1993	38	30.9	N/A	22.15	0.03	3.322	1972	36.0%	28.7%	0.0%
09AA015	WANN RIVER NEAR ATLIN	2	NATURAL	N	269	1956-1993	38	29.0	N/A	7.15	0.03	1.073	1972	35.1%	27.0%	0.0%
09AE003	SWIFT RIVER NEAR SWIFT RIVER	2	NATURAL	Y	3,320	1956-2005	49	43.0	N/A	46.77	0.01	7.016	1977	37.5%	24.9%	0.0%
09AE004	GLADYS RIVER AT OUTLET OF GLADYS LAKE	2	NATURAL	N	1,910	1956-1993	38	32.0	N/A	14.84	0.01	2.226	1977	38.2%	30.5%	0.0%
10AC002	DEASE RIVER AT MCDAME	3	NATURAL	N	6,940	1957-1993	37	31.0	N/A	102.71	0.01	15.407	1977	36.2%	23.3%	0.0%
10AC003	DEASE RIVER AT OUTLET OF DEASE LAKE	2	NATURAL	N	1,520	1956-1984	29	24.0	N/A	15.50	0.01	2.326	1977	35.2%	14.9%	0.0%
10AC004	BLUE RIVER NEAR THE MOUTH	3	NATURAL	N	1,700	1963-1995	33	31.0	N/A	18.23	0.01	2.734	1977	37.7%	28.1%	0.0%
10AC005	COTTONWOOD RIVER ABOVE BASS CREEK	2	NATURAL	Y	888	1964-2005	42	42.0	1520	18.29	0.02	2.743	1977	34.8%	25.8%	0.0%
10AC006	DEASE RIVER NEAR THE MOUTH	3	NATURAL	N	14,500	1984-1995	12	12.0	N/A	179.09	0.01	26.864	1994	37.5%	37.0%	0.0%
10AD001	HYLAND RIVER NEAR LOWER POST	3	NATURAL	N	9,450	1946-1993	47	33.0	N/A	136.59	0.01	20.489	1981	35.5%	28.0%	0.0%
10BA001	TURNAGAIN RIVER ABOVE SANDPILE CREEK	3	NATURAL	N	6,580	1967-1993	27	25.0	N/A	87.64	0.01	13.146	1977	37.2%	26.4%	0.0%
10BB001	KECHIKA RIVER AT THE MOUTH	3	NATURAL	N	22,700	1962-1995	29	25.0	N/A	245.50	0.01	36.825	1977	38.5%	31.5%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\libra25.burnaby.kerrwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

2013 Resource Options Report Update Appendix 8-A2
RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT - MARCH 2011

BC HYDRO & POWER AUTHORITY

Table A-2: WSC Station Hydrologic Data

Station ID	Name	Hydrologic Zone	Regulated/Natural Flow	Active	Area	Period	Number of Years Recorded	Net Years	Mean Basin Elevation	Mean Annual Discharge (MAD)	Mean Annual Runoff (MAF)	Fishflow (15% of MAF)	Minimum Flow Year	Plant Capacity Factor	Firm Energy Factor	Dependable Capacity Factor
					km ²				m	m ³ /s	m ³ /s/km ²	m ³ /s	(for firm energy)	(1.5 x MAD design flow, 15% MAD Fishflow, and turbine shut off 20% of design flow, presented in factors)		
10BB002	KECHIKA RIVER ABOVE BOYA CREEK	3	NATURAL	N	11,200	1967-1994	28	26.0	N/A	141.16	0.01	21.174	1977	39.1%	32.8%	0.0%
10BC001	COAL RIVER AT THE MOUTH	3	NATURAL	N	9,190	1961-1995	35	31.0	N/A	97.87	0.01	14.680	1977	35.3%	30.1%	0.0%
10BE001	LIARD RIVER AT LOWER CROSSING	3	NATURAL	Y	104,000	1944-2005	61	49.0	N/A	1128.82	0.01	169.323	1977	38.7%	30.9%	0.0%
10BE004	TOAD RIVER ABOVE NONDA CREEK	3	NATURAL	Y	2,570	1961-2005	45	42.0	1715	43.33	0.02	6.500	1997	36.7%	31.5%	0.0%
10BE005	LIARD RIVER ABOVE BEAVER RIVER	4	NATURAL	N	119,000	1968-1995	28	26.0	N/A	1416.23	0.01	212.435	1977	39.3%	30.4%	0.0%
10BE006	LIARD RIVER ABOVE KECHIKA RIVER	3	NATURAL	N	61,600	1969-1995	27	25.0	N/A	708.18	0.01	106.227	1977	38.2%	31.5%	0.0%
10BE007	TROUT RIVER AT KILOMETRE 783.7 ALASKA HIGHWAY	3	NATURAL	Y	1,190	1970-2005	36	34.0	1502	16.31	0.01	2.447	1994	40.4%	30.3%	0.0%
10BE008	GEDDES CREEK AT THE MOUTH	3	NATURAL	N	78	1979-1996	18	16.9	N/A	0.19	0.00	0.029	1983	47.6%	19.6%	0.0%
10BE009	TEETER CREEK NEAR THE MOUTH	3	NATURAL	Y	211	1979-2005	27	26.0	1144	1.17	0.01	0.175	1998	50.7%	28.5%	21.5%
10BE010	TOAD RIVER NEAR THE MOUTH	4	NATURAL	N	6,900	1983-1995	13	12.0	N/A	106.90	0.02	16.036	1991	37.9%	30.6%	0.0%
10BE011	GRAYLING RIVER NEAR THE MOUTH	3	NATURAL	N	1,780	1983-1995	13	12.0	N/A	16.54	0.01	2.481	1988	33.0%	23.9%	0.0%
10BE012	RABBIT RIVER NEAR THE MOUTH	3	NATURAL	N	3,780	1983-1995	13	11.7	N/A	38.80	0.01	5.820	1989	38.8%	30.2%	0.0%
10CA001	FONTAS RIVER NEAR THE MOUTH	4	NATURAL	Y	7,400	1988-2005	14	12.0	N/A	31.07	0.00	4.660	2000	30.8%	24.1%	0.0%
10CB001	SIKANNI CHIEF RIVER NEAR FORT NELSON	6	NATURAL	Y	2,160	1944-2005	62	47.9	1566	25.93	0.01	3.890	1946	35.5%	24.9%	0.0%
10CC001	FORT NELSON RIVER AT FORT NELSON	4	NATURAL	N	43,500	1960-1978	19	14.0	N/A	333.76	0.01	50.063	1966	36.2%	28.2%	0.0%
10CC002	FORT NELSON RIVER ABOVE MUSKWA RIVER	4	NATURAL	Y	22,800	1978-2004	26	24.0	N/A	137.70	0.01	20.655	1994	32.1%	18.6%	0.0%
10CD001	MUSKWA RIVER NEAR FORT NELSON	4	NATURAL	Y	20,300	1944-2005	62	47.0	1233	213.42	0.01	32.012	1990	36.7%	30.7%	0.0%
10CD003	RASPBERRY CREEK NEAR THE MOUTH	4	NATURAL	Y	273	1979-2005	27	26.0	731	1.04	0.00	0.156	1980	23.9%	18.9%	0.0%
10CD004	BOUGIE CREEK AT KILOMETRE 368 ALASKA HIGHWAY	4	NATURAL	Y	332	1981-2005	25	24.0	871	2.66	0.01	0.399	1994	23.9%	11.8%	0.0%
10CD005	ADSETT CREEK AT KILOMETRE 386.0 ALASKA HIGHWAY	4	NATURAL	Y	109	1983-2005	23	22.0	862	0.89	0.01	0.133	1991	25.4%	14.4%	0.0%

KERR WOOD LEIDAL ASSOCIATES LTD.

Consulting Engineers

\\libra25.burnaby.kerwoodleidal.org\0000-0999\0400-0499\478-103\300-Reports\RoR_Final_Report_2011-03-18\Revised Tables\Hydrology-Appendix-2010Update-EM.xls

Appendix B

Roads & Power Lines Cost Estimation Using GIS

List of Tables

- Table B-1: Cost Surface Development Process
- Table B-2: Power Line Costs for Technically Inaccessible Projects
- Table B-3: Road Construction Unit Cost (\$/m)
- Table B-4: Interconnection Rules – New Power Line to Existing Power Line
- Table B-5: Interconnection Rules – New Power Line to Existing Substation
- Table B-6: Minimum Distance Between Potential Interconnection Points
- Table B-7: Power Line Cost
- Table B-8: Transmission Voltages – Maximum Capacity and Distance
- Table B-9: Submarine Cable Cost
- Table B-10: Interconnection Cost to Existing Power Lines
- Table B-11: Transformation Cost

List of Figures

- Figure B-1: Estimated Cost for Access
- Figure B-1: Estimated Cost for 25kV Power Lines
- Figure B-1: Estimated Cost for 69kV Power Lines
- Figure B-1: Estimated Cost for 138kV Power Lines
- Figure B-1: Estimated Cost for 230kV Power Lines
- Figure B-1: Estimated Cost for 500kV Power Lines

2013 Resource Options Report Update Appendix 8-A2 Appendix B

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Road & Power Line Cost Estimating Using GIS

Access road and power line costs were developed using GIS tools. The toolset identifies the least expensive route from power projects to existing roads or existing power systems.

These tools were used to develop unit cost surfaces of the entire province for road and power line construction.

The sources and processes for developing the road and power line costs are described in Table B-1

Table B-1: Cost Surface Development Process

Feature	Source/Author	Usage	Process
Public Roads	National Road Network (geobase.ca)	Roads	Used as sources for road cost routine.
Overhead Wires	BC Hydro and Fortis BC	Power Lines	Used as sources for power line cost routine.
Slope	Canadian Digital Elevation Data (CDED)	Roads & Power Lines	Elevation data converted to slope, and categorized into cost classes. Slopes exceeding 30% and 75% were considered to be not feasible for construction of roads and power lines, respectively.
Proximity to Major Cities	Site classification (see Section 3.2.1)	Roads	Greater cost values were assigned to locations further away from city centres.
Land Cover	AVHRR 1:2M Land Cover (geogratis.ca)	Roads & Power Lines	Costs were adjusted based on land cover (i.e. forest, rock, croplands). Permanent snow and ice were considered infeasible for construction.
Parks	BC Parks and Protected Areas (Irdw.ca) Canada Lands Administrative Boundaries (geogratis.ca)	Roads & Power Lines	Parks were masked out so that no new roads or power lines can cross provincial and federal parks.
Water	Output from the Power calculation model Watershed Atlas	Roads & Power Lines	Costs were assigned to small rivers that can be crossed with culverts or small bridges. Large rivers and lakes were not considered for crossing.
Forest Roads	Forest Tenure Roads (Irdw.ca)	Roads & Power Lines	Construction costs were discounted along existing forest roads.

The proposed project locations were overlaid with the resulting accumulated cost output and total road cost extracted. Some locations were found to be inaccessible as determined by the cost routine. These locations were reviewed and either assigned an approximate cost based on the output or assigned a \$100 million cost for roads if the project is technically inaccessible.

Similarly, locations found to be inaccessible by power line were assigned a cost as presented in Table B-2.

2013 Resource Options Report Update Appendix 8-A2 Appendix B

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table B-2: Power Line Costs for Technically Inaccessible Projects

New Power Line Voltage (kV)	Technically Inaccessible Cost (\$)
25	50,000,000
69	120,000,000
138	300,000,000
230	1,000,000,000
500	3,000,000,000

The above costs are much higher than any of the cost output from the GIS routine and are intended to render a project economically infeasible due to inaccessibility to roads or power lines.

Clustering of projects to reduce costs through sharing of common infrastructure was outside of this study's scope.

After the cost accumulation process, individual paths from sources to project locations were traced using the GIS tools. While this process identified common paths amongst adjacent projects, it was assumed that each project would be constructed independently. This is a key factor in the overall cost estimate as road and power line costs make up a significant portion of most projects, especially in remote areas.

ACCESS ROADS

Access roads were considered to begin at an existing, documented road and follow the least-cost path to the project location. The primary costs for roads were based on road gradient and distance to major centres. Adjustments to unit costs were made for crossing barren rocky areas, wetlands and agricultural areas. Nominal costs were assigned to existing forestry roads to account for maintenance and road upgrading. The forestry road costs were approximately an order of magnitude less than construction of new roads. This resulted in the least-cost path generally following these corridors until the vicinity of a proposed site was reached.

Roads were assumed not to traverse legally protected areas, large water bodies, glaciers or road grades exceeding 30%. If the site was in proximity to a large body of water, barge access was considered.

Development (engineering, environmental and other) and annual costs (O&M, land acquisition and property taxes, but not water rentals) were added on as a percentage of capital cost. The percentages used are noted in Section 3 of the Report.

Road costs also included a 30% contingency.

**2013 Resource Options Report Update Appendix 8-A2
Appendix B**

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table B-3: Road Construction Unit Cost (\$/m)

Site Location Category	Slope	\$/m
A	0-5%	121
	5-10%	153
	10-15%	216
	15-20%	278
	20-30%	402
B	0-5%	209
	5-10%	241
	10-15%	303
	15-20%	366
	20-30%	490
C & D	0-5%	296
	5-10%	328
	10-15%	391
	15-20%	453
	20-30%	577

Four site categories were used to indicate remoteness of location. Category A sites were located within a 50 km radius of a major town or city centre (population of 25,000 or more). Category B and C sites were located within 200 and 400 km from a centre, respectively, and Category D sites were located anywhere outside a 400 km radius from a centre (see Figure 3-1).

Barge Access

Potential projects that were sited close to the shoreline of a large lake, the coast or a major inlet were given the opportunity to have barge access. In the case of lakes only large lakes (>50 km²) in close proximity to roads (<500 m) were allowed for barge access. A barge access cost allowance was included for projects based on the construction duration: \$700,000 for 1 year, \$1,000,000 for 2 years, and \$1,300,000 for 3 years of construction.

Estimated costs for access can be found in Figure B-1.

POWER LINE, INTERCONNECTION AND TRANSFORMATION COSTS

As with access roads development (engineering, environmental and other) and annual costs (O&M, land acquisition and property taxes) were added on as a percentage of capital cost. The percentages used are noted in Section 3 of the report.

These costs also included a 30% contingency.

Estimated costs for power lines from 25 kV through 500 kV can be found in Figures B-2 through B-6.

2013 Resource Options Report Update Appendix 8-A2 Appendix B

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

ALLOWABLE INTERCONNECTION LOCATIONS

Independent power line (an unshared line that is used by one project to interconnect to the BC Hydro grid) interconnection occurred at either:

1. An existing power line (BC Hydro or Fortis BC grid) or the proposed 287 kV Northwest Transmission Line (NTL) from Skeena to Bob Quinn Lake substation; or
2. An existing substation (BC Hydro or Fortis BC grid) or the proposed 287 kV substation at Bob Quinn.

Interconnection to the existing system with independent power lines was not allowed at non-integrated substations or to power lines only connected to a non-integrated substation. This included the non-integrated existing Fort Nelson Substation (FNG) and line 1L359 from Alberta to FNG.

Table B-4 details the interconnection rules used to define whether a new power line can connect to an existing power line or to an existing substation. Table B-5 details the interconnection rules used to define whether a new power line can connect. Shaded grey cells indicate that interconnection is not allowed.

Table B-4: Interconnection Rules – New Power Line to Existing Power Line

New Power Line Voltage (kV)	Existing Power Line Voltage (kV) ^a				
	12.5, 25, & 34.5	60, 63 ^b & 69	138 132 ^b , 161 ^b	230 & 287	360 & 500
25	D.I. ^c	S.S. ^d	S.S.	S.S.	X
69	X	S.S.	S.S.	S.S.	X
138	X	X	S.S.	S.S.	X
230	X	X	X	S.S.	X
500	X	X	X	X	X

Notes:

- a) If the voltage level of the new power line is not available at the existing substation, then a transformation cost will apply.
- b) FortisBC System Voltage
- c) D.I. = direct interconnection without a sectionalizing substation
- d) S.S = interconnection only with a sectionalizing substation
- e) 25 kV power lines were allowed to connect to 12.5 kV power lines in the BC Hydro system as it was assumed the system will eventually be upgraded to 25 kV. Either a 25 kV to 12.5 kV transformer would be required at the point of interconnection or the 12.5 kV power line would be upgraded to 25 kV. This transformation or upgrade cost was ignored.

2013 Resource Options Report Update Appendix 8-A2 Appendix B

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table B-5: Interconnection Rules – New Power Line to Existing Substation

New Power Line Voltage (kV)	Lowest Voltage Available at Existing Substation (kV) ^a					
	12.5, 25, & 35	60, 63 ^b & 69	138, 132 ^b , 161 ^b	230, 238 & 287	360	500
25 ^c	√	√	√	√	X	X
69	X	√	√	√	√	X
138	X	X	√	√	√	√
230	X	X	X	√	√	√
500	X	X	X	X	X	√

Notes:
a) If the voltage level of the new power line is not available at the existing substation, then a transformation cost will apply.
b) FortisBC system voltage
c) 25 kV power lines were allowed to connect to 12.5 kV substations in the BC Hydro system as the system will eventually be upgraded to 25kV. A 25 kV to 12 kV transformer would be required at the point of interconnection. This transformation cost was ignored.

New power lines were only allowed to connect at specific points along an existing power line (be it a direct tap in the case of 25 kV or a sectionalizing substation in the case of 60, 69, 138, 230, or 287 kV). Allowable interconnection locations were positioned a minimum distance between each other and existing substations (Table B-6). The allowable interconnection locations also were placed in locations with lower terrain slope (i.e. at flatter locations not on the side of a hill).

Table B-6: Minimum Distance between Potential Interconnection Points

Existing Power Line Voltage (kV)	Min. Distance (km)
12.5, 25, & 34.5	10
60, 63 & 69	20
132, 138 & 161	60
230, 238 & 287	100

POWER LINE COSTS

The power line costs estimated for the 2007 Run-of-River (RoR) study by KWL were escalated to 2011 dollars using 2% per year (6% total). Costs vary with the slope in KWL's least-cost routing method (see KWL's Run-of-River Hydroelectric Resource Assessment for British Columbia 2007 study for discussion). The estimated 2011 power line costs are presented in Table B-7

Power lines were assumed to not traverse legally protected areas, glaciers or topography with grades exceeding 75%.

2013 Resource Options Report Update Appendix 8-A2 Appendix B

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table B-7: Power Line Cost

New Power Line Voltage (kV)	Cost (\$/km), 2011 Dollars		
	Avg. Slope (0-15%)	Avg. Slope (16-30%)	Avg. Slope (31 - 75%)
25	84,800	169,600	254,400
69	106,000	212,000	318,000
138	159,000	318,000	477,000
230	265,000	530,000	795,000
500	530,000	1,060,000	1,590,000

Table B-8 presents the assumed maximum capacities and distances allowable for new power lines in this study.

Table B-8: Transmission Voltages – Maximum Capacity and Distance

Voltage Level (kV)	Maximum Capacity Range (MW)	Maximum Power Line Distance (km)
25	20	20
69	60	60
138	150	100
230	500	N/A
500	1,500	N/A

Table B-9 provides estimated submarine cable costs.

Table B-9: Submarine Cable Cost

New Submarine Cable Voltage (kV)	\$M/km
25	0.5
69	1.0
138	3.6
230	5.3
500	7.1

INTERCONNECTION & TRANSFORMATION COSTS

Tables B-10 & B-11 provide estimates for the unit interconnecting station cost and transformation costs.

Table B-10: Interconnection Cost to Existing Power Lines

New Power Line Voltage (kV)	Interconnecting Station Cost or Sectionalizing Substations (required to connect to 69kV, 138kV and 230kV, and 287 kV)	Interconnection Costs to an Existing Power Line – Without a Sectionalizing Substation Required (only 25kV to 25kV, 12 kV and 35kV)
25	\$1.5M	\$400k
69	\$7.5M	
138	\$9.5M	
230	\$10.5M	

2013 Resource Options Report Update Appendix 8-A2 Appendix B

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table B-11: Transformation Cost

New Generation Power Line Voltage (kV)	Lowest Voltage Available Existing Substation (kV)						
	(Only apply if there is not a voltage level available at the substation)						
	25 & 34.5	69	138	230	287	360	500
25 ^a	\$0	\$1.5M	\$1.5M	\$1.5M	\$1.5M	X	X
69 ^b	X	\$0	\$7.5M	\$7.5M	\$7.5M	\$7.5M	
138	X	X	\$0	\$12M	\$12M	\$15M	\$18M
230	X	X	X	\$0	\$0 ^b	\$13.5M	\$16.5M
500	X	X	X	X	X	X	\$0

Notes:
a) In absence of information, the sectionalizing substation cost was used.
b) There was no transformation cost assumed since the power line would likely be built at 287, which would be a similar cost to a 230 kV.

TOTAL POWER LINE AND INTERCONNECTION COSTS

The total cost was calculated as follows for the two scenarios:

1. New power line and interconnection to an existing power line was calculated as follows:

$$\text{Total cost} = C_{PL} \times L_{PL} + (C_{Int_PL_Direct} \text{ or } C_{Int_PL_SS}) + C_{Tran}$$

Where:

C_{PL} = power line cost per length (varies with slope and kV)

L_{PL} = power line length

$C_{Int_PL_Direct}$ = cost of direct tap interconnection to an existing power line only applies to 25kV to 25kV (and also for 25 kV to 12.5 kV or 35kV in the BC Hydro system)

$C_{Int_PL_SS}$ = cost of interconnection using a sectionalizing substation to connect to an existing power line. (Not required for 25kV to 25kV, 12.5 kV, or 34.5 kV power lines.)

C_{Tran} = cost of transformation (based on kV of the new power line and kV of the power line), only applies if the kV of the new power line is lower than the kV of the existing power line.

2. New power line and interconnection to an existing substation would include:

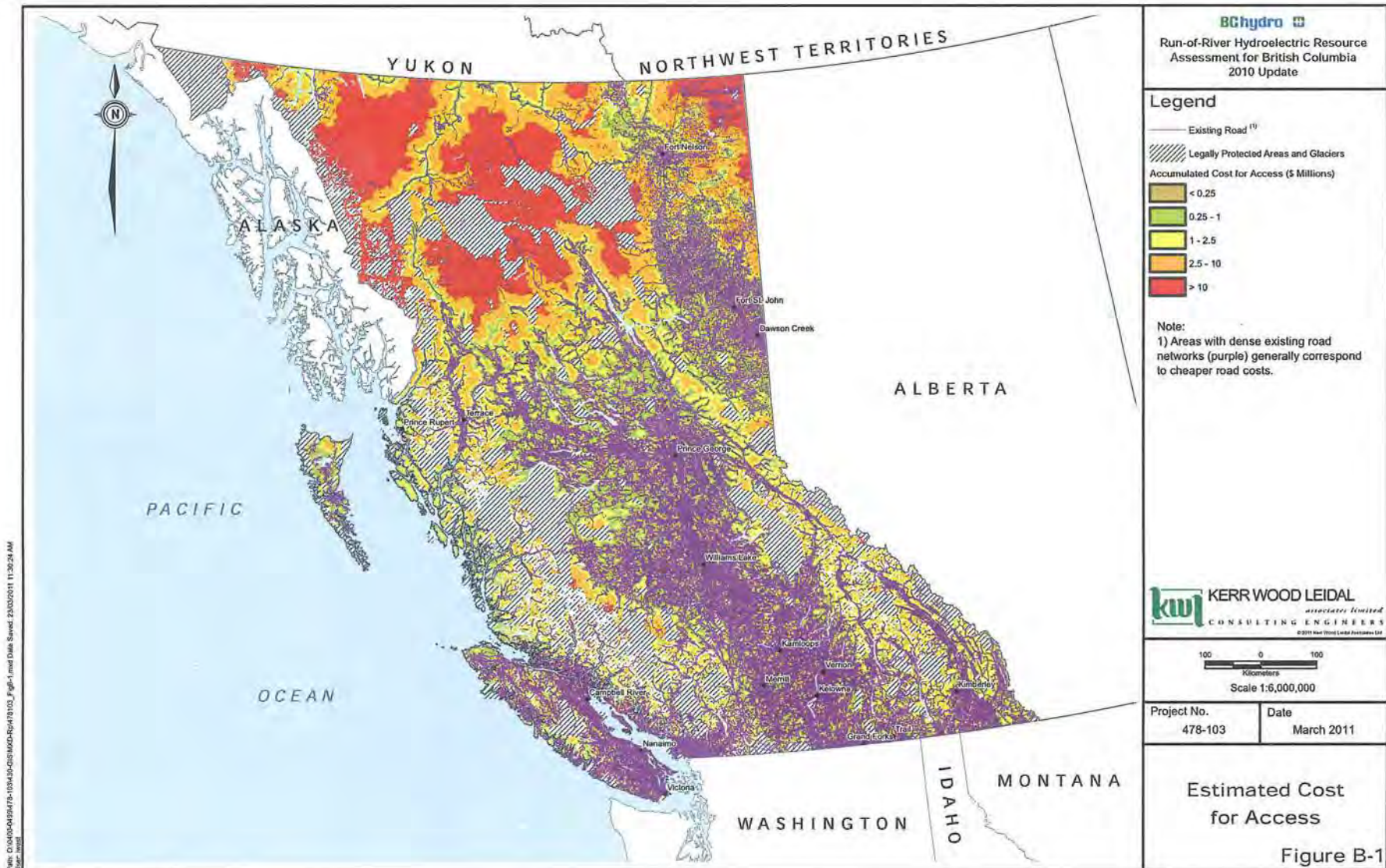
$$\text{Total cost} = C_{PL} \times L_{PL} + C_{Tran}$$

Where:

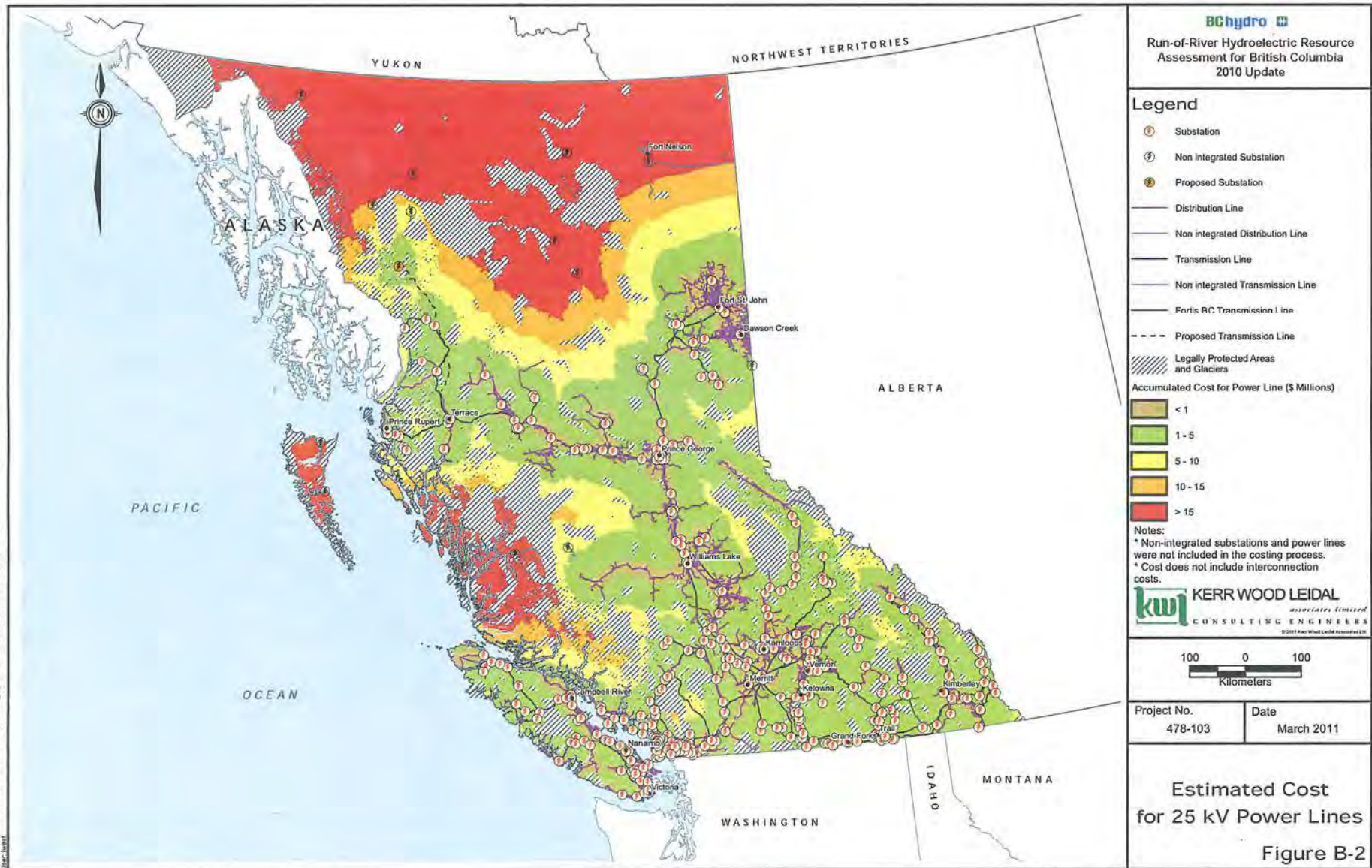
C_{PL} = power line cost per length (varies with slope and kV)

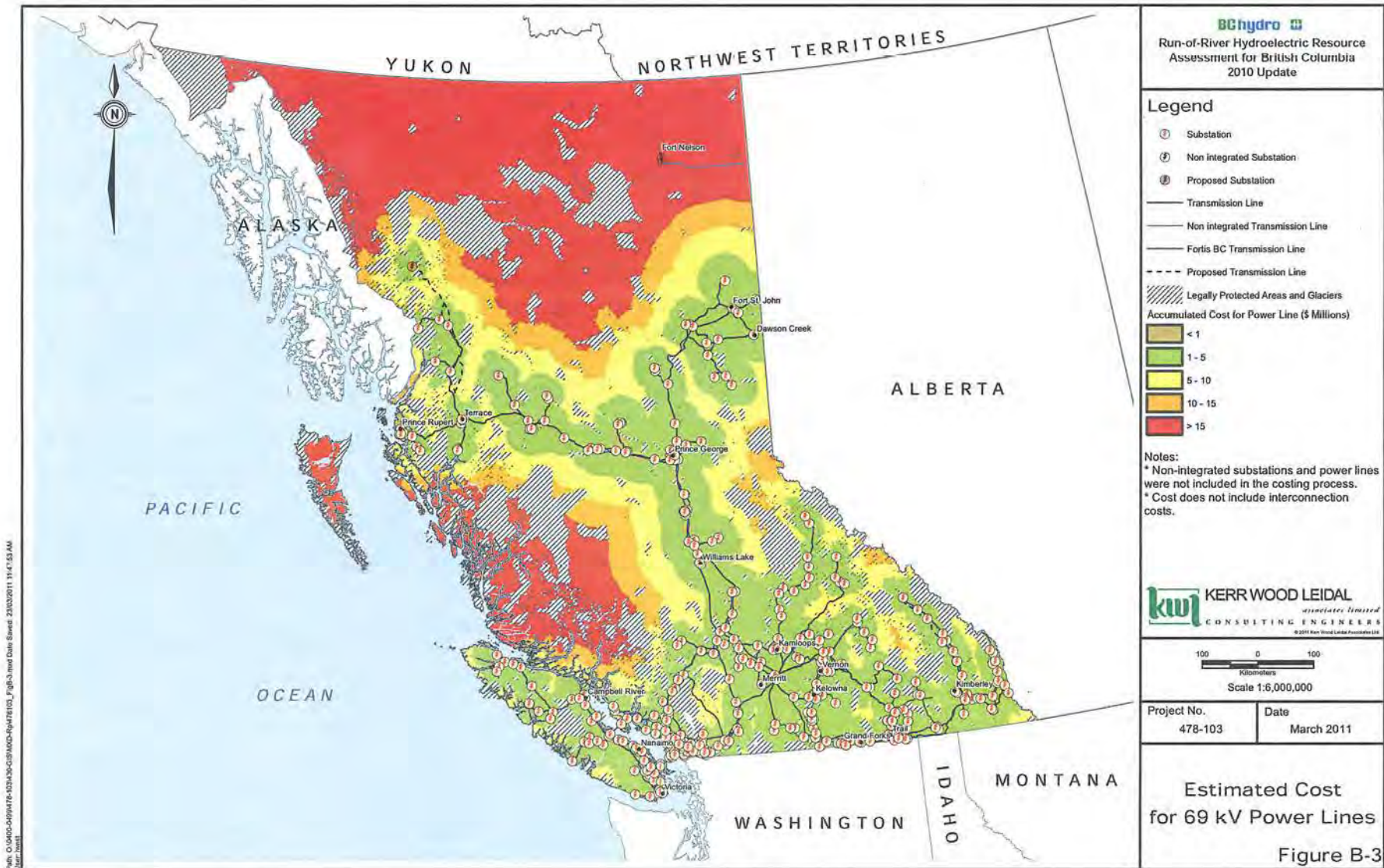
L_{PL} = power line length

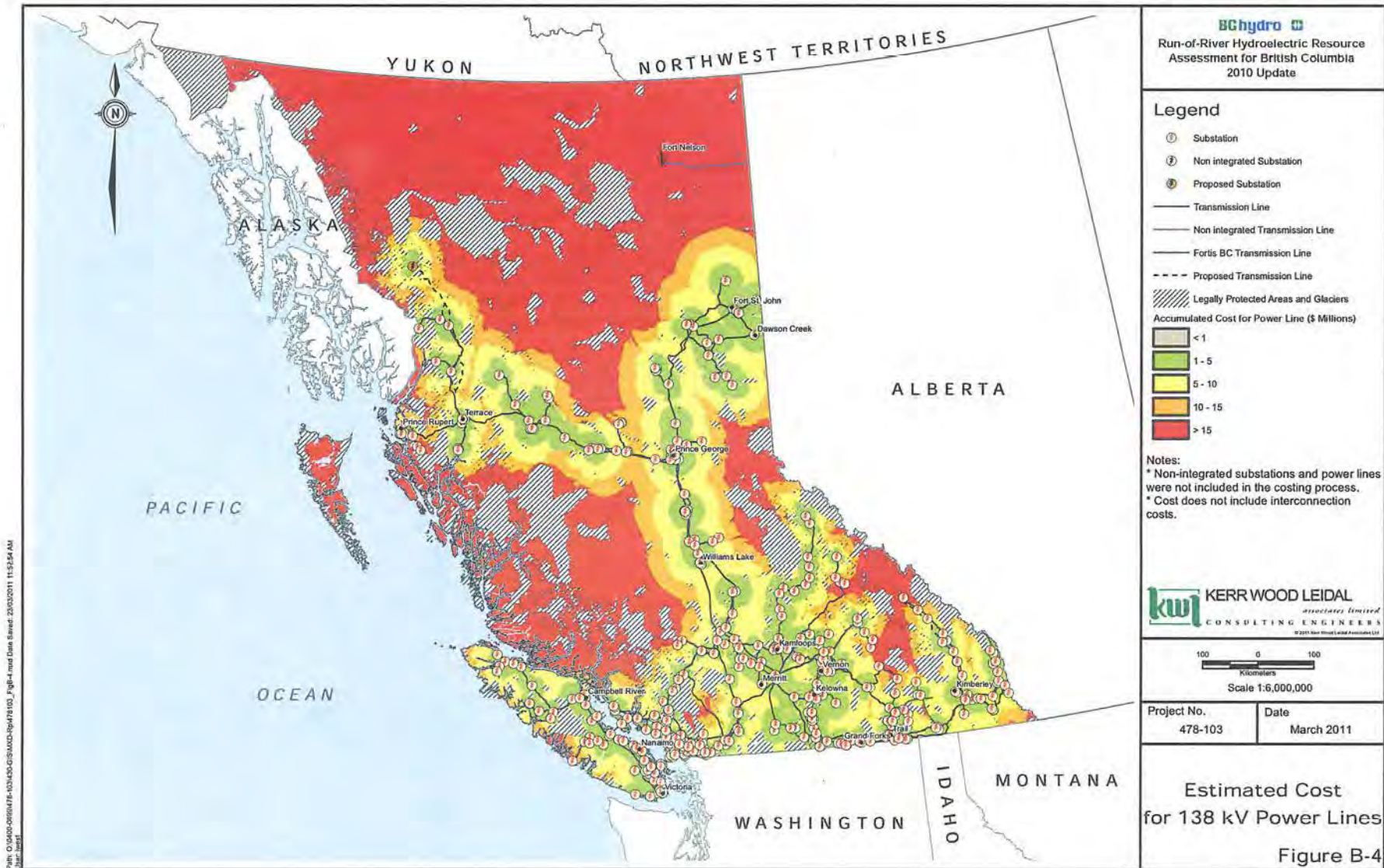
C_{Tran} = cost of transformation (based on kV of the new power line and kV of the substation if the voltage of the new power line is not available at the substation) = \$0 if the voltage of the power line is available at the existing substation

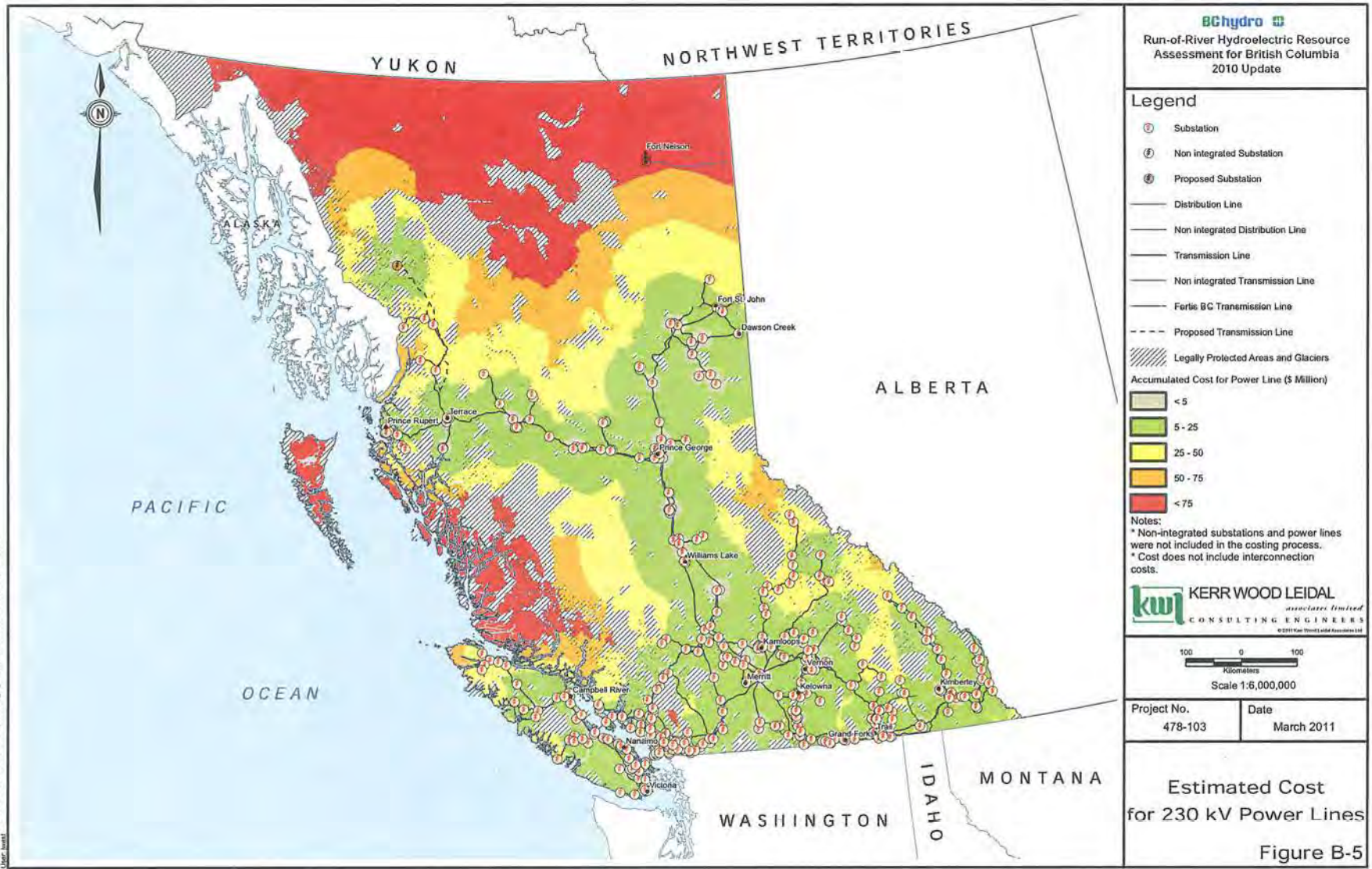


2013 Resource Options Report Update Appendix 8-A2

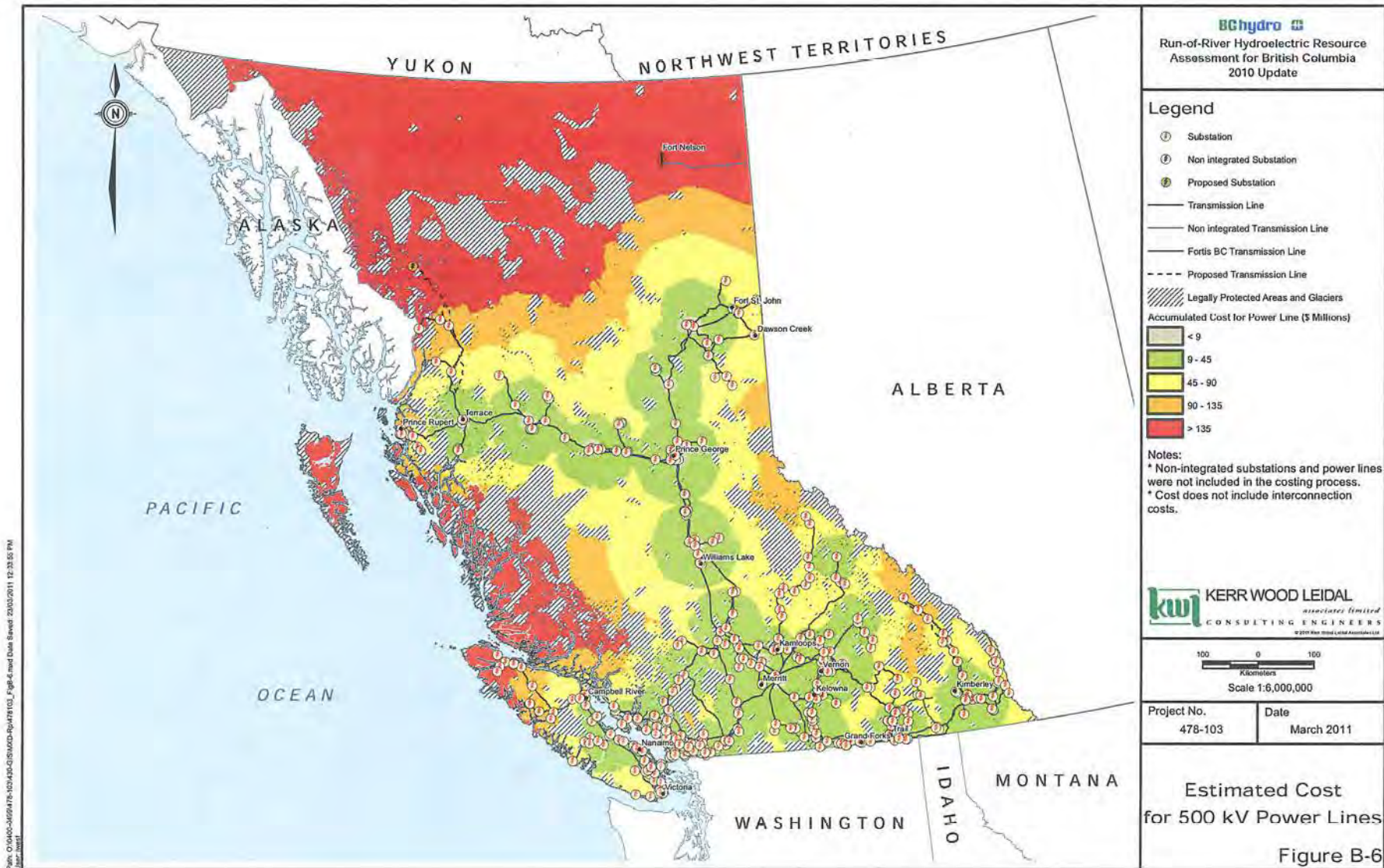








File: C:\B40-09\B478-103\B40-09\B478-103\Fig-B-5.mxd Date Saved: 20/03/2011 12:05:33 PM
 User: brett



Appendix C

Hydropower Potential by Transmission Region

List of Tables

Table C-1: Central Interior Transmission Region Run-of-River Hydro Potential

Table C-2: East Kootenay Transmission Region Run-of-River Hydro Potential

Table C-3: Kelly Nicola Transmission Region Run-of-River Hydro Potential

Table C-4: Lower Mainland Transmission Region Run-of-River Hydro Potential

Table C-5: Mica Transmission Region Run-of-River Hydro Potential

Table C-6: North Coast Transmission Region Run-of-River Hydro Potential

Table C-7: Peace River Transmission Region Run-of-River Hydro Potential

Table C-8: Revelstoke/Ashton Creek Transmission Region Run-of-River Hydro
Potential

Table C-9: Selkirk Transmission Region Run-of-River Hydro Potential

Table C-10: Vancouver Island Transmission Region Run-of-River Hydro
Potential

2013 Resource Options Report Update Appendix 8-A2 Appendix C

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table C-1: Central Interior Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
120 - 129	2	266	216	72	0
130 - 139	1	21	19	6	0
140 - 149	2	178	158	52	0
160 - 169	1	11	10	3	0
170 - 179	6	373	306	108	0
180 - 189	3	100	79	26	1
190 - 199	1	30	27	9	0
200 - 299	31	928	747	252	5
300 - 399	16	307	251	87	0
400 - 499	35	701	533	183	4
500 - 599	24	172	143	51	0
600 - 699	25	300	232	84	0
700 - 799	26	160	124	47	0
800 - 899	28	178	137	50	1
900 - 999	25	121	94	36	0
1000 +	406	1,001	752	306	1
Total	632	4,850	3,827	1,371	14

Table C-2: East Kootenay Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
85 - 89	1	61	55	17	0
95 - 99	2	194	181	59	0
110 - 119	1	107	84	33	0
120 - 129	1	136	121	38	0
140 - 149	1	31	29	9	0
150 - 159	3	123	115	36	0
160 - 169	1	23	22	7	0
170 - 179	5	231	211	66	0
180 - 189	4	189	173	55	0
190 - 199	2	81	73	23	0
200 - 299	47	900	746	279	0
300 - 399	47	557	492	169	0
400 - 499	55	340	274	110	0
500 - 599	43	198	156	67	0
600 - 699	31	101	79	33	0
700 - 799	37	104	80	35	0
800 - 899	19	72	58	23	0
900 - 999	22	49	35	17	0
1000 +	156	190	143	67	0
Total	478	3,689	3,127	1,144	0

2013 Resource Options Report Update Appendix 8-A2 Appendix C

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table C-3: Kelly Nicola Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
75 - 79	2	588	443	154	6
80 - 84	1	66	49	17	0
90 - 94	2	110	83	29	0
95 - 99	1	108	83	27	2
100 - 109	2	150	113	39	2
110 - 119	4	205	165	56	0
120 - 129	3	116	88	29	2
130 - 139	4	202	166	55	1
140 - 149	3	114	94	32	0
150 - 159	5	152	121	41	1
160 - 169	6	236	196	66	1
180 - 189	3	90	78	25	0
190 - 199	5	158	131	44	0
200 - 299	47	632	487	173	1
300 - 399	38	360	280	103	1
400 - 499	27	170	135	50	0
500 - 599	26	131	103	39	0
600 - 699	10	36	23	12	0
700 - 799	13	41	32	13	0
800 - 899	7	20	15	6	0
900 - 999	11	23	17	7	0
1000 +	118	152	107	52	0
Total	338	3,860	3,010	1,068	18

Table C-4: Lower Mainland Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
65 - 69	1	89	66	20	2
70 - 74	3	212	172	53	1
80 - 84	3	429	331	107	5
85 - 89	2	116	87	27	0
90 - 94	3	177	141	44	2
95 - 99	5	305	228	72	6
100 - 109	19	1,215	937	282	22
110 - 119	22	1,167	873	271	20
120 - 129	6	170	128	40	4
130 - 139	10	281	208	64	6
140 - 149	16	688	519	155	16
150 - 159	6	297	220	68	5
160 - 169	6	136	109	32	1
170 - 179	8	223	168	51	3
180 - 189	6	128	94	30	2
190 - 199	9	245	180	57	2
200 - 299	43	832	617	197	10
300 - 399	21	363	282	89	3
400 - 499	14	87	67	21	1
500 - 599	3	13	10	4	0
600 - 699	7	41	32	12	0
700 - 799	2	16	13	5	0
800 - 899	6	48	36	12	1
900 - 999	4	19	15	5	0
1000 +	28	44	33	14	0
Total	253	7,342	5,564	1,731	114

2013 Resource Options Report Update Appendix 8-A2 Appendix C

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table C-5: Mica Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
110 - 119	2	85	73	23	1
130 - 139	1	36	34	10	0
140 - 149	3	78	65	21	1
150 - 159	7	275	239	76	1
160 - 169	6	193	166	54	1
170 - 179	8	263	237	75	1
180 - 189	6	130	118	37	0
190 - 199	5	98	85	27	0
200 - 299	41	853	740	246	0
300 - 399	27	509	459	152	0
400 - 499	17	224	206	69	0
500 - 599	5	58	52	17	0
600 - 699	6	39	33	12	0
700 - 799	12	55	44	19	0
800 - 899	2	9	7	3	0
900 - 999	6	16	12	6	0
1000 +	35	82	70	27	0
Total	189	3,003	2,639	873	5

Table C-6: North Coast Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
75 - 79	1	76	60	18	0
95 - 99	1	77	64	21	0
100 - 109	1	171	142	47	0
110 - 119	3	159	130	42	0
120 - 129	3	205	163	50	0
130 - 139	7	480	395	130	0
140 - 149	6	244	198	65	0
150 - 159	3	136	109	34	0
160 - 169	9	492	404	132	0
170 - 179	8	254	207	67	0
180 - 189	9	218	176	56	0
190 - 199	16	439	358	120	0
200 - 299	92	2,470	2,010	678	1
300 - 399	104	2,215	1,813	615	1
400 - 499	93	1,527	1,245	425	0
500 - 599	78	977	792	276	0
600 - 699	80	779	627	224	0
700 - 799	66	678	541	193	0
800 - 899	64	742	592	211	0
900 - 999	46	375	298	110	0
1000 +	2,394	6,929	5,344	2,138	2
Total	3,084	19,641	15,668	5,653	4

2013 Resource Options Report Update Appendix 8-A2 Appendix C

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table C-7: Peace River Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
300 - 399	7	161	141	54	0
400 - 499	11	121	102	40	0
500 - 599	14	61	52	21	0
600 - 699	12	101	82	32	0
700 - 799	14	92	76	31	0
800 - 899	22	81	69	28	0
900 - 999	15	63	52	22	0
1000 +	979	1,819	1,448	604	0
Total	1,074	2,498	2,022	831	0

Table C-8: Revelstoke/Ashton Creek Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
90 - 94	1	67	51	17	1
100 - 109	4	176	155	48	1
110 - 119	6	332	278	89	3
120 - 129	4	243	231	70	0
130 - 139	4	154	141	43	1
140 - 149	8	264	234	74	1
150 - 159	7	182	159	50	1
160 - 169	3	72	57	19	1
170 - 179	1	14	12	4	0
180 - 189	2	84	82	25	0
190 - 199	8	205	189	58	0
200 - 299	64	1,097	968	315	2
300 - 399	40	328	261	95	0
400 - 499	22	128	103	38	0
500 - 599	18	83	69	26	0
600 - 699	7	15	11	4	0
700 - 799	11	33	23	11	0
800 - 899	10	33	26	10	0
900 - 999	4	8	5	3	0
1000 +	54	100	74	35	0
Total	278	3,616	3,130	1,034	12

2013 Resource Options Report Update Appendix 8-A2 Appendix C

RUN-OF-RIVER HYDROELECTRIC RESOURCE ASSESSMENT
FOR BRITISH COLUMBIA 2010 UPDATE
FINAL REPORT – MARCH 2011

BC HYDRO & POWER AUTHORITY

Table C-9: Selkirk Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
100 - 109	3	278	248	80	0
110 - 119	3	142	127	40	0
120 - 129	2	71	64	20	0
130 - 139	4	178	159	51	0
140 - 149	1	69	63	21	0
150 - 159	1	12	10	3	0
160 - 169	1	58	56	17	0
170 - 179	2	79	73	23	0
180 - 189	1	19	17	6	0
200 - 299	14	373	313	119	0
300 - 399	22	193	154	61	0
400 - 499	18	145	116	50	0
500 - 599	18	101	79	34	0
600 - 699	13	46	35	16	0
700 - 799	15	63	42	24	0
800 - 899	6	27	16	10	0
900 - 999	14	54	46	18	0
1000 +	124	182	111	72	0
Total	262	2,091	1,728	665	0

Table C-10: Vancouver Island Transmission Region Run-of-River Hydro Potential

Price Bundle	Number of Projects	Average Annual Energy (GWh/yr)	Annual Firm Energy (GWh/yr)	Installed Capacity (MW)	Dependable Generating Capacity (MW)
80 - 84	1	435	318	98	12
90 - 94	1	343	256	77	9
100 - 109	1	145	113	48	9
110 - 119	5	1,314	979	294	36
120 - 129	1	45	34	11	2
130 - 139	5	354	258	83	10
140 - 149	4	253	189	58	8
150 - 159	7	794	609	183	17
160 - 169	4	205	168	47	4
170 - 179	9	321	236	79	11
180 - 189	6	443	324	103	10
190 - 199	5	74	55	19	3
200 - 299	73	2,236	1,692	560	44
300 - 399	77	1,155	847	307	26
400 - 499	73	761	550	207	11
500 - 599	48	370	274	101	9
600 - 699	50	557	421	143	8
700 - 799	34	380	281	95	5
800 - 899	29	369	274	93	3
900 - 999	30	395	302	99	3
1000 +	230	1,315	991	329	14
Total	693	12,264	9,171	3,032	253