

APPENDIX A.
HYDROMETRIC SUMMARIES FOR SELECTED SITES IN BRITISH COLUMBIA

Nineteen sites on BC streams were selected for investigating the appropriateness of different standard-setting approaches (Table A1). These sites have long-term historic flow records, and represent several geoclimatic regions and a range of stream sizes. The flow records were extracted from Water Survey of Canada HYDAT database, and used to investigate the effects of different diversion scenarios during the development of the instream flow standards. We have assumed that surface flows at these sites are relatively unaffected by water or land uses, so we made no attempt to “naturalize” the records.

The flow records were summarized graphically and numerically and are presented in this appendix. The graphs in the upper left are multipanel plots where each panel represents a year from the period of record. The y axis is limited to 50% of the maximum flow on record to enhance resolution for low flow periods. These plots allow one to visualize variation in timing, magnitude, and duration of flows from one year to another.

Tables in the upper right numerically summarizes the flow records by month and for the period of record. The summary statistics include minimum, maximum, mean, median, and 10th, 20th, 30th, and 40th percentile.

Plots in the lower left present superposed flow records for each year on record. The light blue represents average daily flows, the dark blue line is the 90th percentile for each day of the year, the red line is the median for each day of the year, and the green line is the 10th percentile for each day of the year.

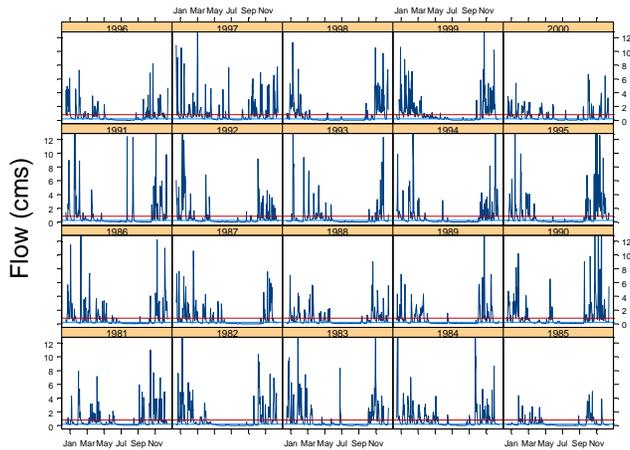
Plots in the lower middle present the quantiles for different flows over the period of record. This plot can be used to visualize the proportion of time that flows are greater than a specific value (i.e., exceedences). The grey vertical line is the mean annual discharge.

Plots in the lower right present the mean and median flows for each month. The upper hydrograph line is based on the mean flows; the lower hydrograph line is based on median flows. Several horizontal lines are provided for reference: mean annual discharge, and the 10th, 20th, 30th, 40th and 50th percentile of flows over the period of record.

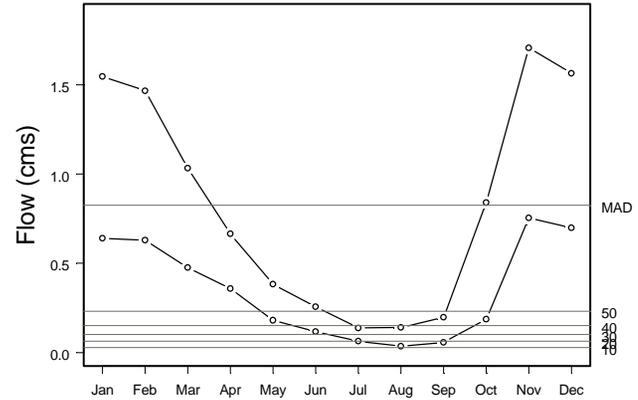
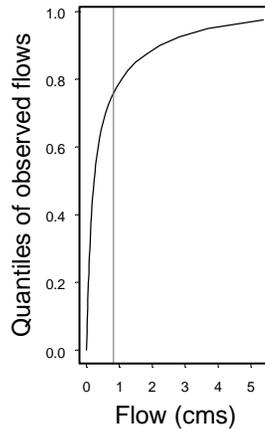
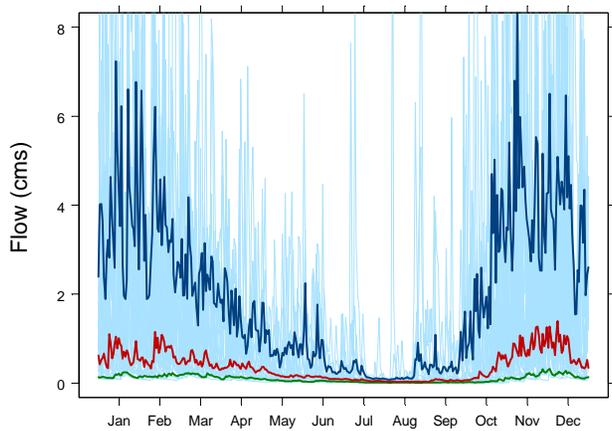
Table A1. Nineteen sites on BC streams were selected for investigating various standard-setting approaches.

Region	Gauge no.	Gauge name	Period of record	Comments
Coastal, Dry	08HA016	Bings Creek near mouth	1961 - 2000	Small stream, east coast Vancouver Island
Coastal, Dry	08HA001	Chemainus River near Westholme	1914 - 2000	Good record, low flows in summer
Coastal, Dry	08HB025	Browns River near Courtenay	1960 - 2000	Proposed IPP
Coastal, Wet	BCH inflow file	Heber River u/s of diversion	1959 - 1999	BCH synthesized daily inflow u/s of diversion dam
Coastal, Wet	08HB048	Carnation Creek at the mouth	1973 - 2000	Well known, good data, 20+ years, small stream
Coastal, Wet	08PA001	Skagit River near Hope	1915 - 1955	Wilderness area, old station
Coastal, Wet	08MH056	Sleese Creek near Vedder Crossing	1957 - 2000	Unregulated
Coastal, Wet	08OB002	Pallant Creek near Queen Charlotte	1962 - 2000	Fish hatchery at mouth, but ds of gauge. Lake headed
Interior, Dry	08LB072	Louis Creek at mouth	1971 - 1996	Well known interior coho stream
Interior, Dry	08LB078	Lemieux Creek at mouth	1977 - 2000	Well known interior coho stream
Interior, Dry	08NL070	Similkameen River above Goodfellow	1974 - 2000	Wilderness in headwaters (Manning)
Interior, Dry	08NL007	Similkameen River near Princeton	1914 - 2000	Considerable irrigation withdrawals below this point
Interior, Dry	08NM173	Greata Creek near mouth	1970 - 2000	Small stream in dry interior
Interior, Dry	08NM171	Vaseux Creek above Solco Creek	1970 - 2000	Larger stream in dry interior, snowmelt dominated
Interior, Dry	08MA006	Lingfield Creek at mouth	1974 - 2000	Small stream in the Chilcotin.
Interior, Wet	08NE039	Big Sheep Creek near Rossland	1929 - 2000	Unregulated
Interior, Wet	08NH006	Moyie River at Eastport	1915 - 2000	Lake headed, snowmelt dominated
Interior, Wet	08MF062	Coquihalla River below Needle Creek	1965 - 2000	Well known
Interior, Wet	08MF003	Coquihalla River near Hope	1911 - 1983	Well known

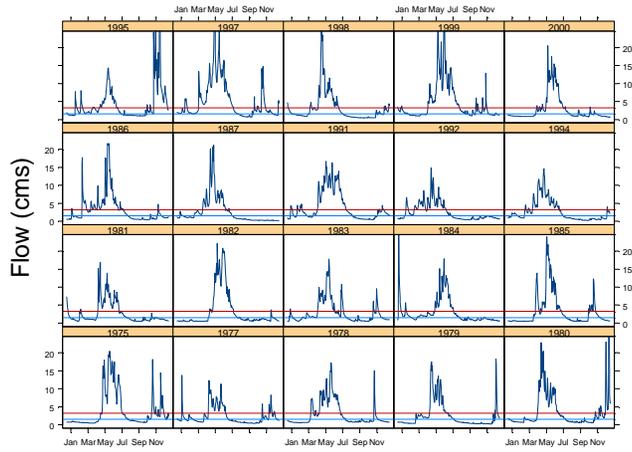
Station Name: Carnation Creek at the mouth
 Station ID: 08HB048
 Period of record: 1973-2000



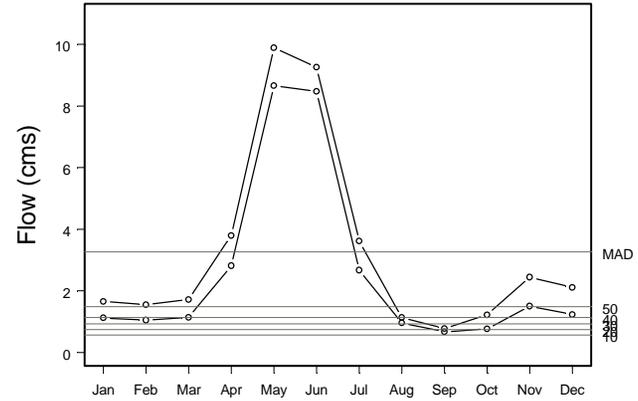
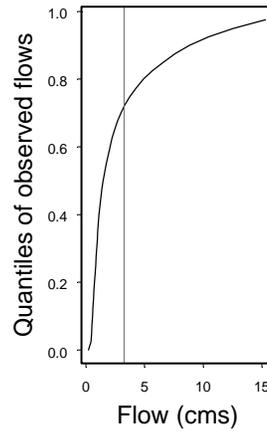
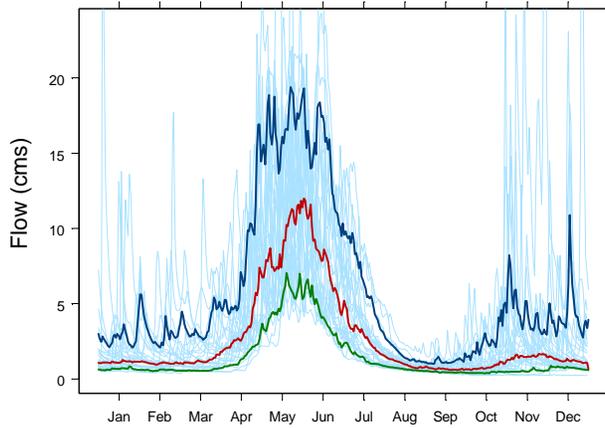
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.076	20.000	1.547	0.641	0.138	0.214	0.300	0.424
Feb	0.058	23.200	1.467	0.630	0.147	0.201	0.297	0.444
Mar	0.071	12.800	1.033	0.477	0.166	0.221	0.280	0.356
Apr	0.036	7.120	0.665	0.358	0.112	0.160	0.214	0.274
May	0.025	4.600	0.383	0.181	0.056	0.088	0.114	0.141
Jun	0.009	6.510	0.257	0.117	0.035	0.056	0.075	0.096
Jul	0.004	8.360	0.138	0.064	0.019	0.028	0.035	0.049
Aug	0.003	12.400	0.141	0.036	0.010	0.018	0.021	0.027
Sep	0.004	7.330	0.197	0.057	0.014	0.022	0.027	0.037
Oct	0.005	13.200	0.840	0.187	0.023	0.046	0.077	0.127
Nov	0.012	24.700	1.707	0.754	0.127	0.234	0.350	0.488
Dec	0.057	21.600	1.564	0.699	0.150	0.234	0.324	0.486
PoR	0.003	24.700	0.825	0.232	0.029	0.063	0.102	0.152



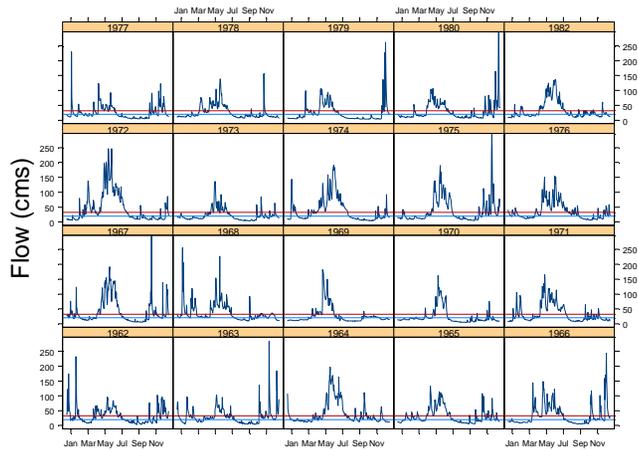
Station Name: Coquihalla below Needle Creek
 Station ID: 08MF062
 Period of record: 1965-2000



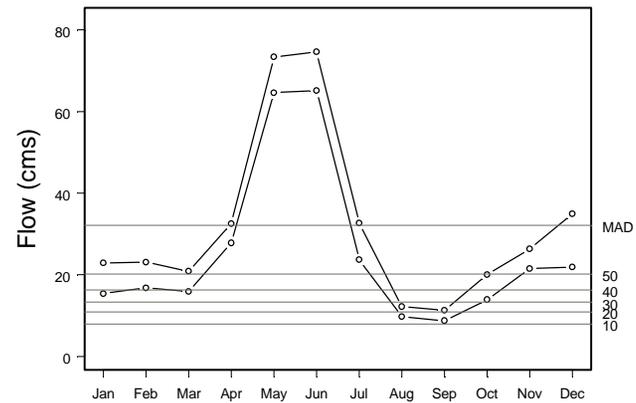
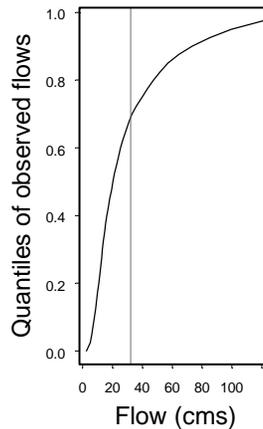
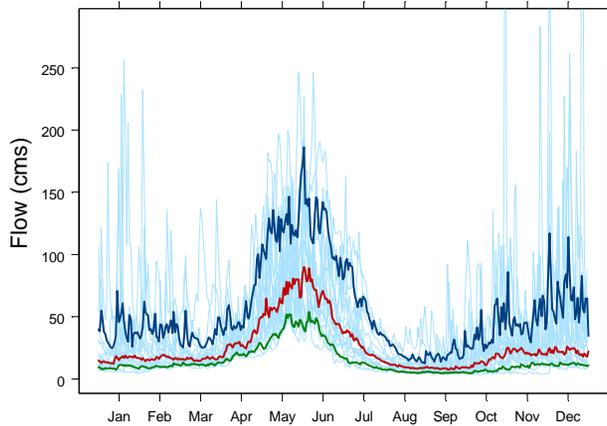
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.465	33.5	1.654845	1.12	0.6407	0.787	0.8981	0.9876
Feb	0.392	17.7	1.548976	1.05	0.5588	0.668	0.77	0.8642
Mar	0.386	13.3	1.715051	1.14	0.555	0.663	0.8332	0.9994
Apr	0.47	22.9	3.790288	2.815	1.009	1.45	1.97	2.3
May	1.97	34.7	9.887062	8.66	4.3	5.41	6.385	7.36
Jun	1.89	34.1	9.260191	8.47	3.678	4.798	5.797	7.196
Jul	0.742	14.4	3.612838	2.67	1.14	1.554	1.94	2.278
Aug	0.455	4.93	1.132058	0.956	0.6097	0.696	0.7611	0.869
Sep	0.273	3.23	0.777345	0.669	0.457	0.504	0.5527	0.597
Oct	0.25	28.6	1.22091	0.765	0.4277	0.4828	0.5511	0.66
Nov	0.24	47.3	2.442548	1.5	0.4808	0.7156	1.05	1.28
Dec	0.237	46	2.111347	1.23	0.6663	0.8094	0.9412	1.06
PoR	0.237	47.3	3.267214	1.49	0.564	0.739	0.926	1.13



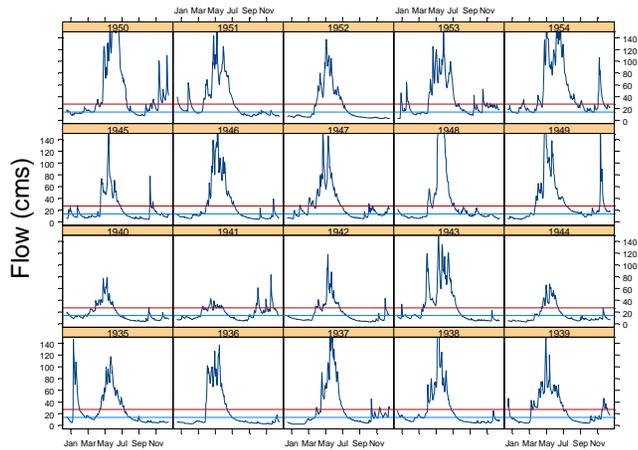
Station Name: Coquihalla near Hope
 Station ID: 08MF003
 Period of record: 1911-1983



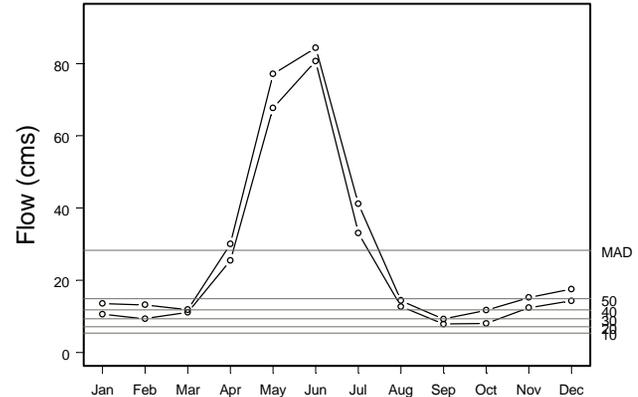
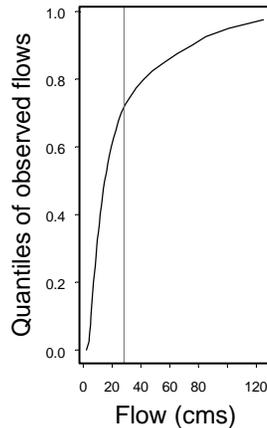
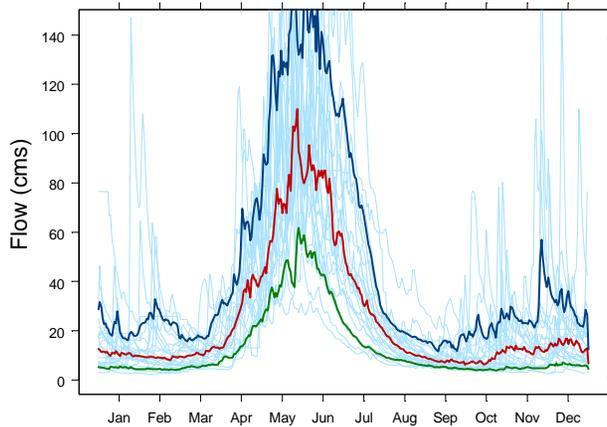
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	4.96	256	22.88955	15.4	8.383	10.9	11.8	13.3
Feb	4.9	232	23.10989	16.8	9.57	11.3	13	14.4
Mar	8.1	144	20.85484	15.9	11.3	12.7	13.6	14.6
Apr	10.4	132	32.52712	27.8	16.8	19.5	22.27	24.86
May	18.8	246	73.36657	64.6	35.7	43.3	50.4	56.3
Jun	12.3	246	74.61818	65.1	30.39	42.14	48.47	55.68
Jul	5.66	163	32.66639	23.7	10.71	13.4	16.8	19.9
Aug	3.54	58	12.18856	9.755	5.66	6.91	8.01	9.012
Sep	2.66	92	11.30174	8.75	5.007	5.8	6.51	7.42
Oct	3.48	572	20.0356	13.9	5.496	7.196	8.929	11.44
Nov	3.61	283	26.32506	21.5	9.651	12.98	15.77	18.8
Dec	4.38	490	34.96128	21.9	11.1	13.02	15.3	18.94
PoR	2.66	572	32.09327	20.2	7.93	10.9	13.3	16.3



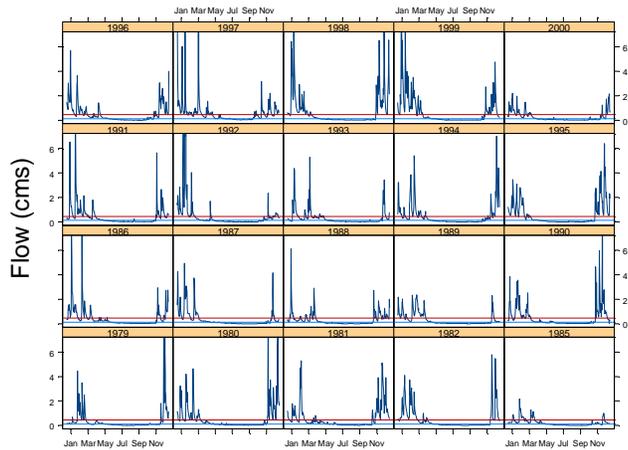
Station Name: Skagit near Hope
 Station ID: 08PA001
 Period of record: 1915-1955



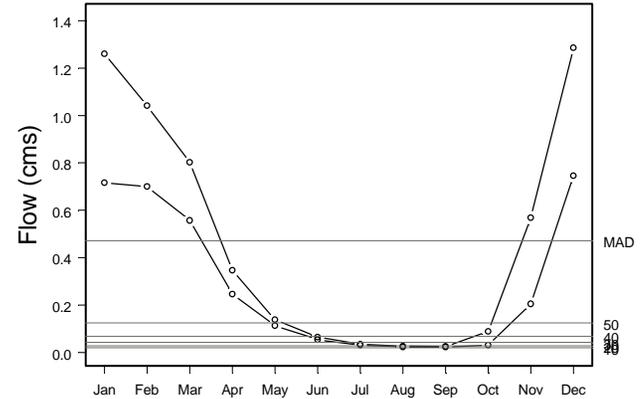
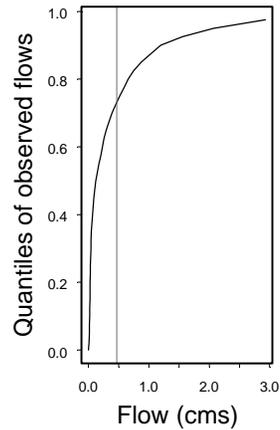
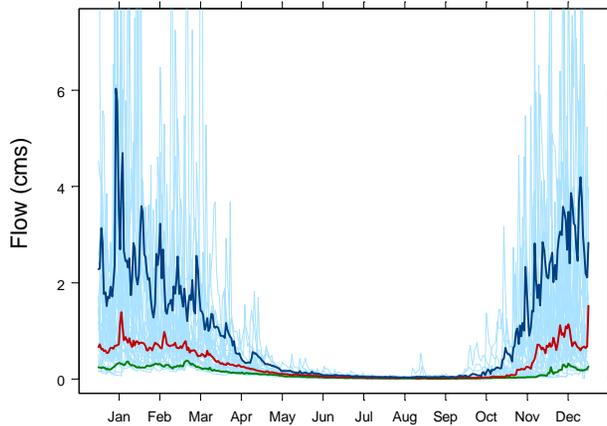
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	2.8	147	13.56378	10.6	4.81	5.944	7.366	9.03
Feb	2.29	108	13.19424	9.33	4.235	5.61	6.82	8.04
Mar	2.8	43	11.83276	11.1	5.332	6.364	7.408	9.43
Apr	4.16	119	30.01965	25.45	10.79	13	16.4	21.8
May	21.4	267	77.13961	67.7	32.6	41.9	51.5	61.32
Jun	16.4	289	84.37	80.7	35.7	49	58.9	68.5
Jul	7.19	205	41.19775	33.1	13.5	18.38	23.4	27.5
Aug	4.84	61.4	14.39608	12.7	6.772	8.2	9.34	10.8
Sep	3.88	33.1	9.22604	7.855	5.037	5.52	6.29	7.02
Oct	3.34	80.4	11.69788	8.04	4.118	4.724	5.3	6.43
Nov	2.55	184	15.21151	12.4	4.67	5.52	6.862	9.648
Dec	2.66	150	17.52379	14.3	5.684	7.584	9.466	11.36
PoR	2.29	289	28.32473	14.9	5.38	7.14	9.34	11.8



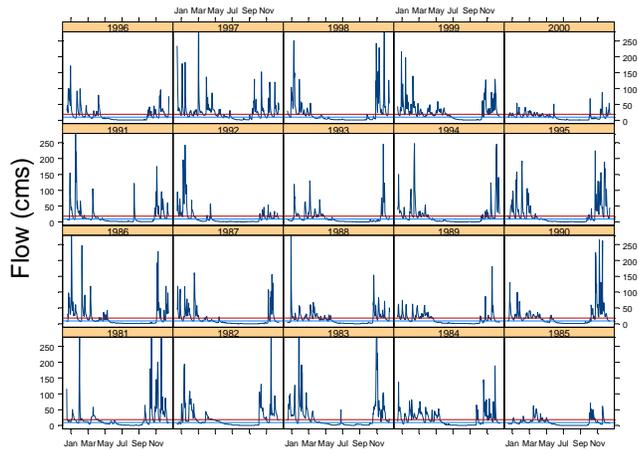
Station Name: Bings Creek near mouth
 Station ID: 08HA016
 Period of record: 1961-2000



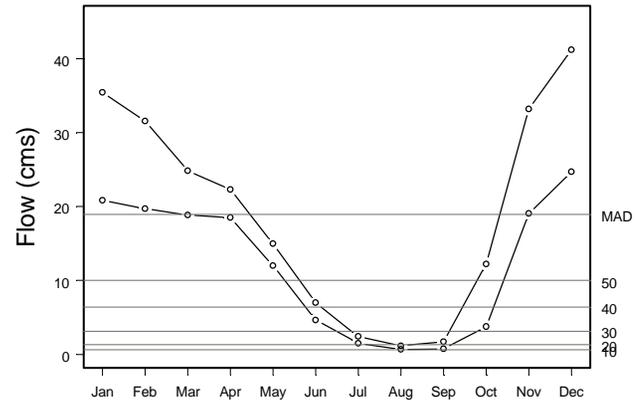
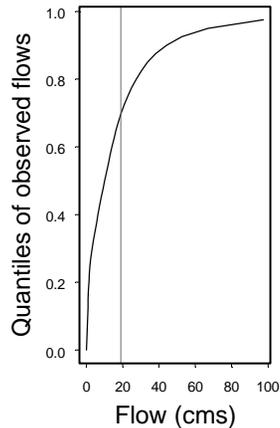
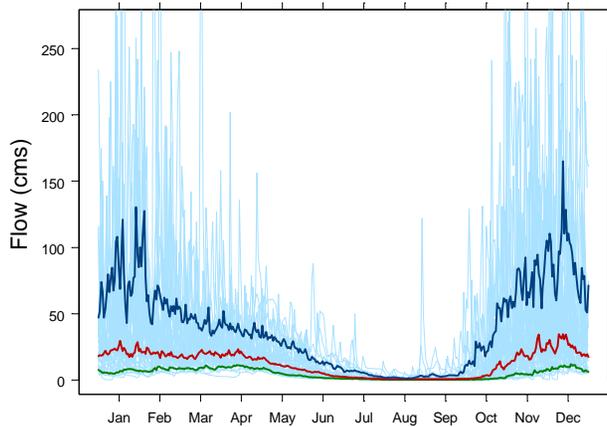
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.068	14.8	1.259368	0.716	0.2466	0.3562	0.454	0.58
Feb	0.139	13.9	1.040818	0.7	0.26	0.3404	0.454	0.58
Mar	0.099	13	0.802535	0.557	0.231	0.299	0.372	0.4656
Apr	0.073	3.68	0.346266	0.246	0.125	0.158	0.185	0.222
May	0.022	0.696	0.137965	0.113	0.063	0.079	0.091	0.102
Jun	0.015	0.44	0.064861	0.054	0.031	0.037	0.042	0.048
Jul	0.004	0.167	0.034761	0.031	0.017	0.02	0.024	0.0268
Aug	0.003	0.538	0.026165	0.023	0.012	0.014	0.017	0.02
Sep	0.002	0.147	0.025692	0.022	0.008	0.013	0.017	0.019
Oct	0.003	3.17	0.08826	0.031	0.018	0.021	0.025	0.028
Nov	0.018	7.68	0.568451	0.205	0.034	0.045	0.0727	0.112
Dec	0.015	12	1.285269	0.745	0.181	0.3208	0.444	0.58
PoR	0.002	14.8	0.471515	0.125	0.02	0.028	0.042	0.069



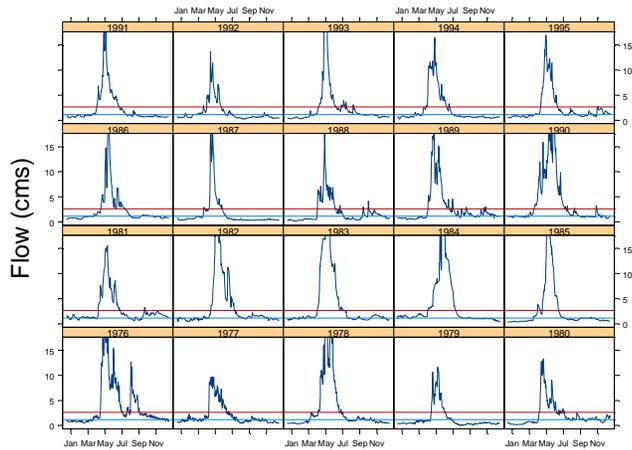
Station Name: Chemainus near Westholme
 Station ID: 08HA001
 Period of record: 1914-2000



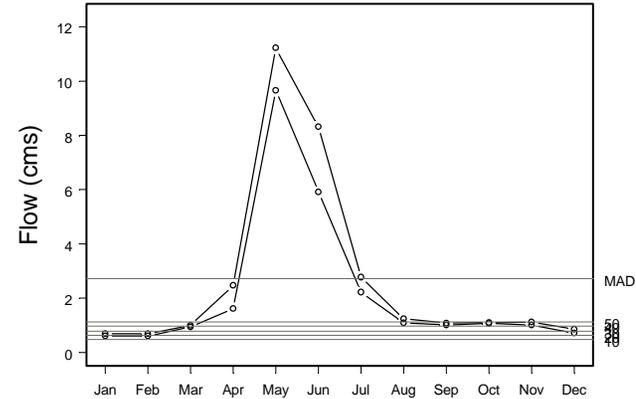
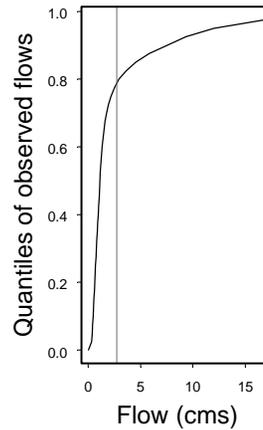
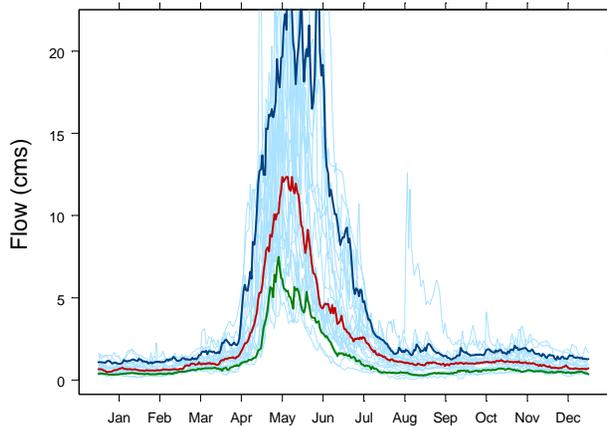
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Jan	0.091	456	35.45203	20.85	6	9.06	13	16.8
Feb	1.77	537	31.54669	19.7	7.259	10.68	13.6	16.5
Mar	2.7	303	24.82327	18.85	8.38	11.2	13.5	16
Apr	2.03	202	22.30736	18.5	9.583	11.6	13.5	15.76
May	1.42	86	14.97919	12	4.71	6.23	7.745	9.73
Jun	0.578	87.8	6.988174	4.655	1.549	2.19	2.8	3.62
Jul	0.227	49.9	2.434675	1.5	0.617	0.816	1.01	1.22
Aug	0.127	122	1.164306	0.685	0.2825	0.4	0.51	0.601
Sep	0.127	66.3	1.735114	0.7405	0.286	0.368	0.4404	0.5786
Oct	0.206	416	12.22394	3.76	0.51	0.87	1.18	1.87
Nov	0.273	374	33.18132	19.05	4.357	7.02	9.63	13.7
Dec	0.071	457	41.18846	24.7	8.35	11.2	15	18.7
PoR	0.071	537	18.94027	10	0.651	1.32	3.14	6.4



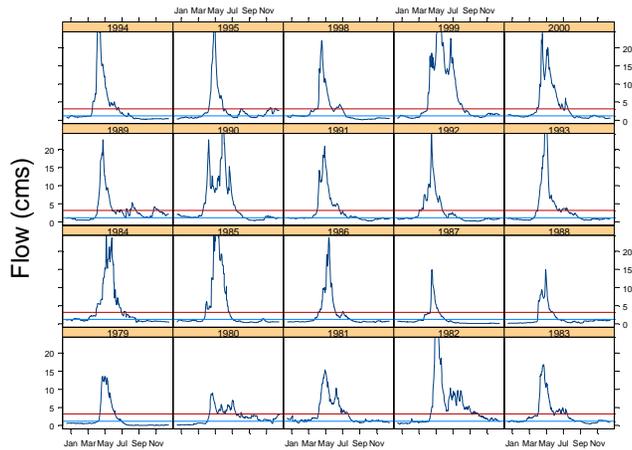
Station Name: Louis Creek at mouth
 Station ID: 08LB072
 Period of record: 1971-1996



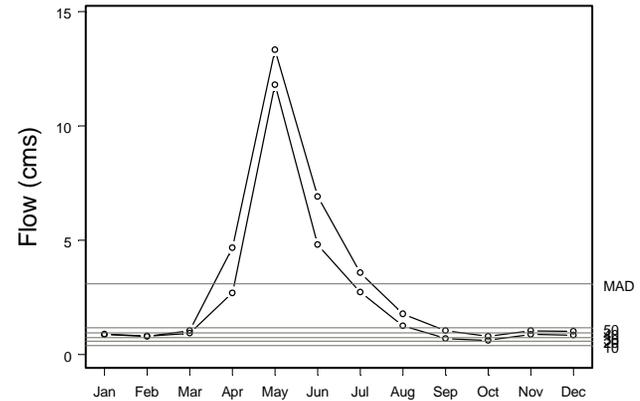
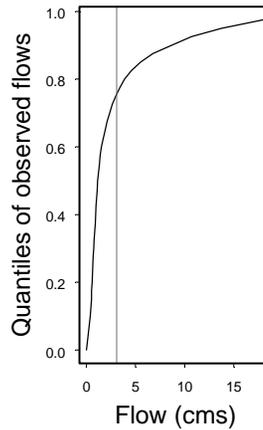
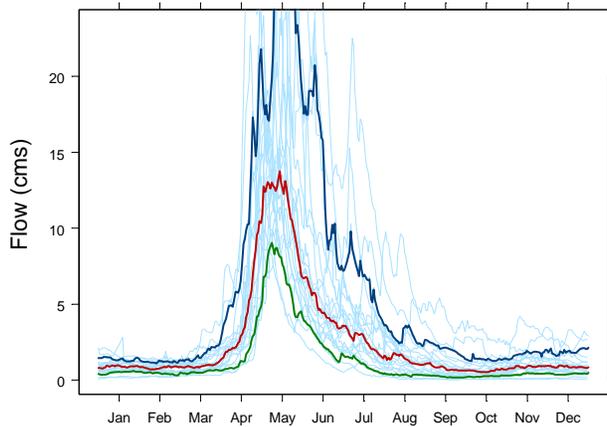
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.142	1.89	0.691902	0.6055	0.35	0.4196	0.4727	0.5356
Feb	0.161	2.27	0.690531	0.605	0.3561	0.4338	0.484	0.5396
Mar	0.364	3.11	1.000952	0.9395	0.568	0.665	0.748	0.881
Apr	0.3	14.7	2.468222	1.61	0.8638	1.1	1.24	1.39
May	1.4	43.3	11.22309	9.66	4.243	5.746	7.298	8.414
Jun	0.813	36.5	8.316039	5.91	2.379	3.23	4.06	4.748
Jul	0.32	12.5	2.772436	2.22	0.8196	1.21	1.579	1.89
Aug	0.028	12.6	1.24141	1.09	0.379	0.6048	0.799	0.939
Sep	0.068	6.09	1.082282	1.01	0.3889	0.63	0.7521	0.872
Oct	0.28	4.14	1.096997	1.07	0.561	0.6852	0.7858	1.01
Nov	0.362	3.27	1.122753	1.01	0.5347	0.64	0.7579	0.9084
Dec	0.207	2.4	0.85238	0.714	0.4429	0.538	0.62	0.6742
PoR	0.028	43.3	2.72263	1.13	0.48	0.63	0.7795	0.971



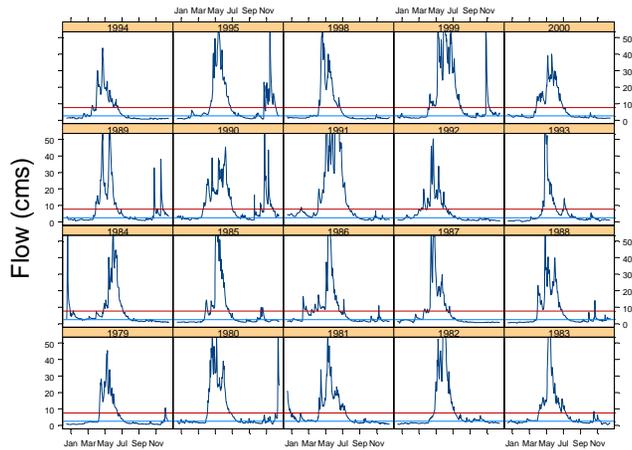
Station Name: Lemieux Creek at mouth
 Station ID: 08LB078
 Period of record: 1977-2000



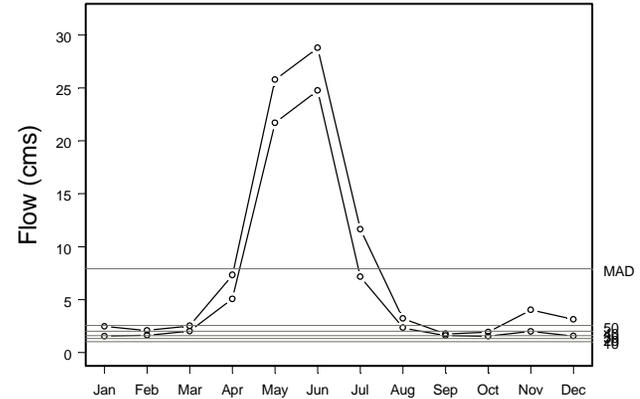
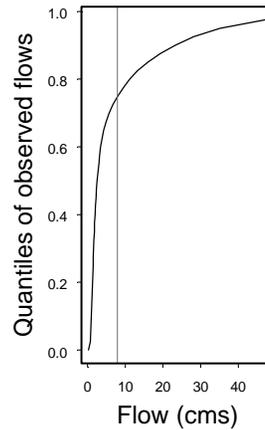
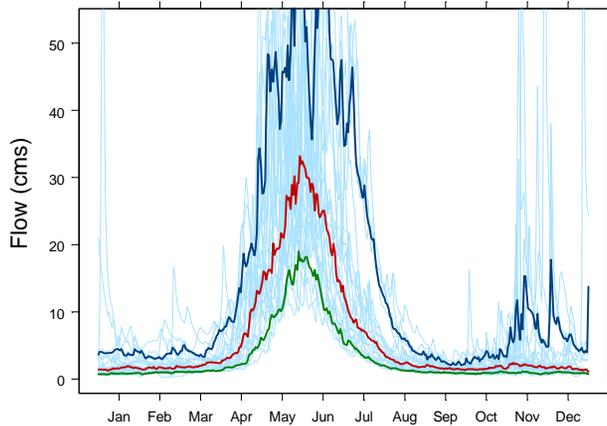
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.06	2.8	0.894198	0.87	0.382	0.575	0.644	0.737
Feb	0.155	1.88	0.798451	0.79	0.374	0.525	0.58	0.65
Mar	0.229	3.87	1.0365	0.927	0.4851	0.589	0.665	0.8078
Apr	0.326	33.6	4.667992	2.695	0.9589	1.396	1.98	2.236
May	2.95	43.3	13.32548	11.8	6.122	7.58	9.006	10.5
Jun	0.593	46.9	6.90332	4.805	2.2	2.978	3.57	4.16
Jul	0.186	22.5	3.574528	2.725	0.8387	1.35	1.806	2.16
Aug	0.023	9.75	1.771773	1.25	0.3242	0.538	0.7443	1.03
Sep	0.021	5.41	1.040389	0.6965	0.1639	0.3178	0.428	0.5756
Oct	0.028	3.93	0.795239	0.617	0.2	0.2992	0.4332	0.524
Nov	0.054	4.19	1.035717	0.882	0.3208	0.5228	0.666	0.7486
Dec	0.045	3.47	1.011342	0.84	0.3454	0.506	0.5953	0.7148
PoR	0.021	46.9	3.084769	1.16	0.3828	0.585	0.74	0.946



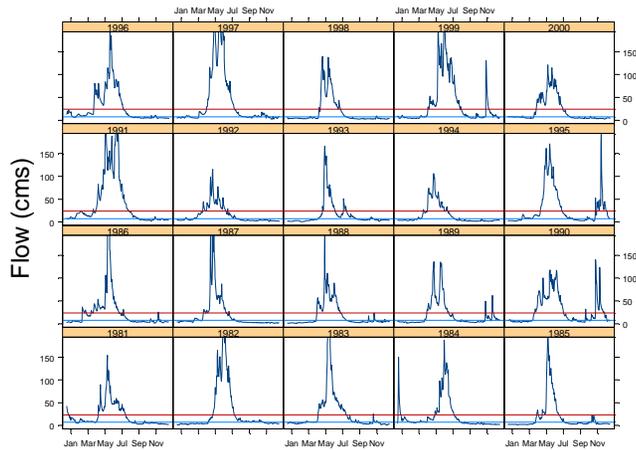
Station Name: Similkameen above Goodfellow Creek
 Station ID: 08NL070
 Period of record: 1974-2000



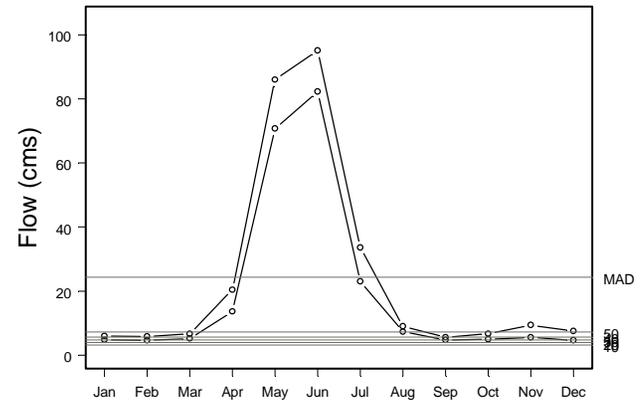
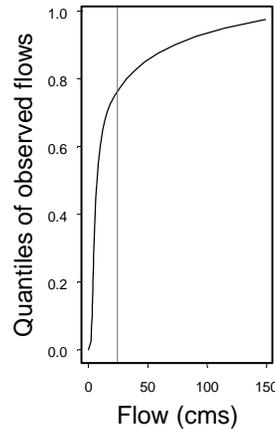
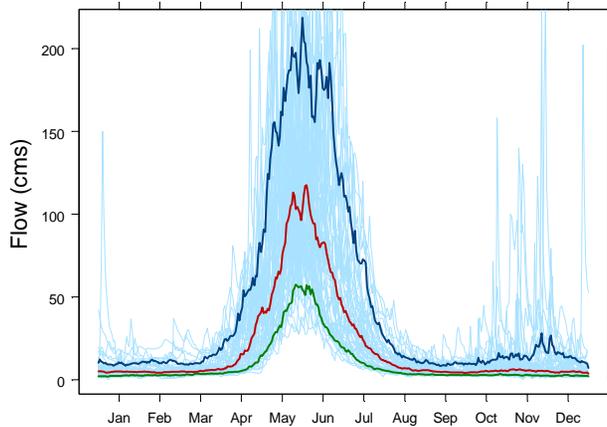
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.305	84.2	2.470268	1.54	0.75	0.9692	1.19	1.39
Feb	0.26	16.6	2.077941	1.62	0.8675	1.12	1.3	1.43
Mar	0.4	10.9	2.509605	2.02	1.124	1.25	1.47	1.676
Apr	1.11	58	7.316787	5.065	1.82	2.406	3.01	3.936
May	3.11	90.8	25.77657	21.7	9.816	12.3	15.4	18.36
Jun	5.09	106	28.78255	24.75	10.39	13.48	17.7	21.2
Jul	1.65	78.9	11.64361	7.15	3.08	4.026	5.04	6.12
Aug	0.913	15.8	3.21009	2.33	1.294	1.56	1.8	2.03
Sep	0.619	5.97	1.75076	1.59	0.923	1.068	1.24	1.41
Oct	0.578	16.3	1.925573	1.53	0.8146	1.058	1.21	1.39
Nov	0.43	97.8	4.012017	1.995	0.85	1.168	1.43	1.7
Dec	0.435	103	3.120421	1.55	0.89	1.06	1.17	1.35
PoR	0.26	106	7.8986	2.56	1.02	1.32	1.6	2



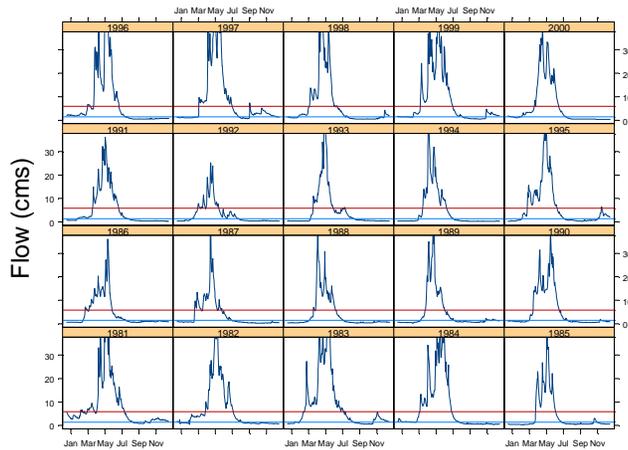
Station Name: Similkameen near Princeton
 Station ID: 08NL007
 Period of record: 1914-2000



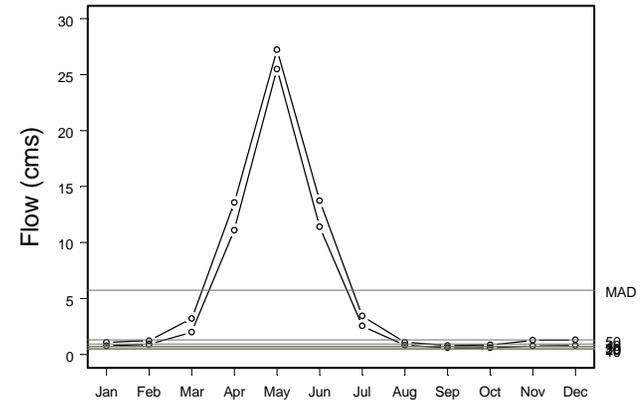
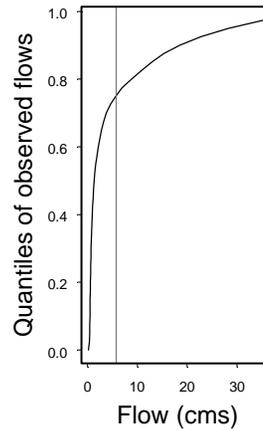
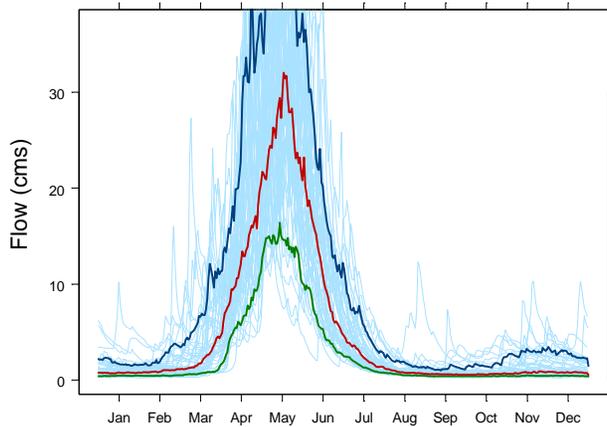
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.142	150	5.951888	4.81	2.32	3	3.62	4
Feb	0.79	37	5.778509	4.6	2.657	3.17	3.62	4.07
Mar	1.16	31.1	6.619772	5.165	3.31	3.79	4.13	4.53
Apr	2.15	199	20.3926	13.6	4.81	6.12	7.544	10.5
May	3.99	377	85.98831	70.75	26.6	35.7	45.9	57.38
Jun	11.5	430	95.0904	82.25	31.49	43.86	56.9	70.08
Jul	2.44	328	33.5871	23	8.872	12.5	15.7	19.1
Aug	1.76	48.1	8.988999	7.295	3.727	4.47	5.27	6.194
Sep	1.51	31.7	5.564333	4.71	2.859	3.326	3.74	4.25
Oct	1.67	158	6.653699	4.96	2.75	3.434	3.88	4.36
Nov	0.425	227	9.365432	5.55	2.629	3.45	4.117	4.81
Dec	1.28	202	7.516885	4.65	2.337	3	3.54	4
PoR	0.142	430	24.34029	7.19	3.11	3.91	4.71	5.66



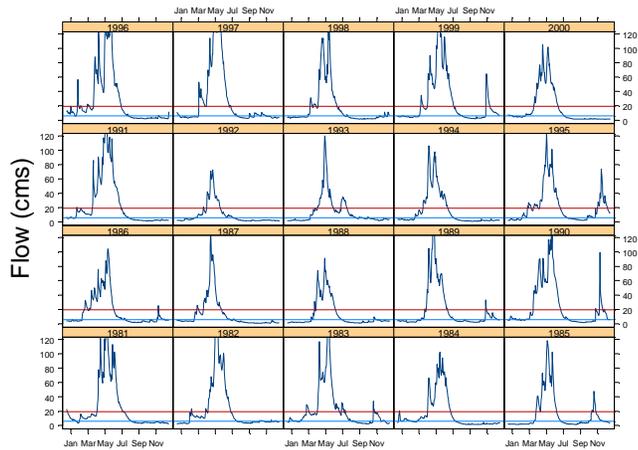
Station Name: Big Sheep Creek near Rossland
 Station ID: 08NE039
 Period of record: 1929-2000



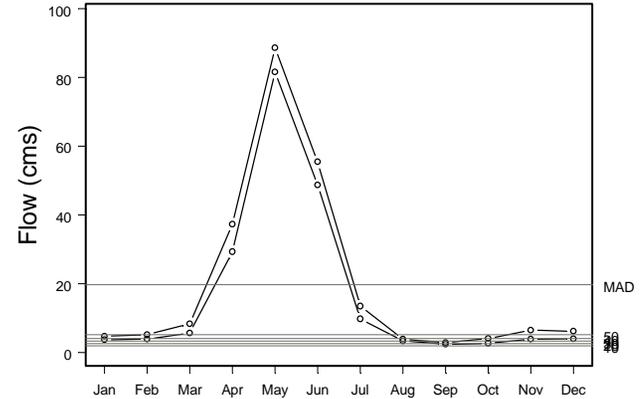
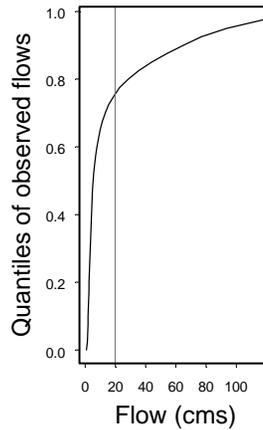
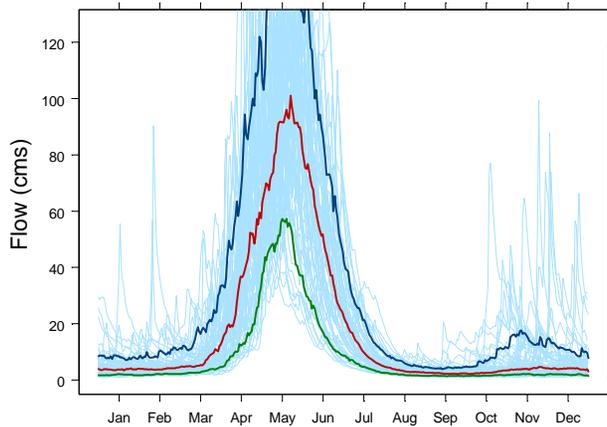
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.241	10.2	1.089036	0.759	0.425	0.49	0.558	0.646
Feb	0.238	16	1.226349	0.898	0.438	0.521	0.612	0.725
Mar	0.289	27.3	3.215929	2	0.623	0.818	1.12	1.33
Apr	0.773	74.2	13.58509	11.1	4.19	5.95	7.981	9.59
May	4.85	72.5	27.21973	25.5	13.7	16.7	19.7	22.5
Jun	1.39	58.6	13.72716	11.4	4.268	5.746	7.551	9.6
Jul	0.668	18.7	3.431335	2.55	1.09	1.43	1.8	2.15
Aug	0.331	12.3	1.079356	0.824	0.515	0.606	0.679	0.753
Sep	0.236	7.34	0.787621	0.59	0.391	0.4538	0.497	0.5396
Oct	0.228	5.22	0.842041	0.6	0.394	0.452	0.493	0.547
Nov	0.198	10.3	1.269877	0.765	0.4218	0.501	0.566	0.629
Dec	0.227	10.3	1.289958	0.793	0.424	0.504	0.583	0.679
PoR	0.198	74.2	5.746485	1.3	0.473	0.58	0.722	0.934



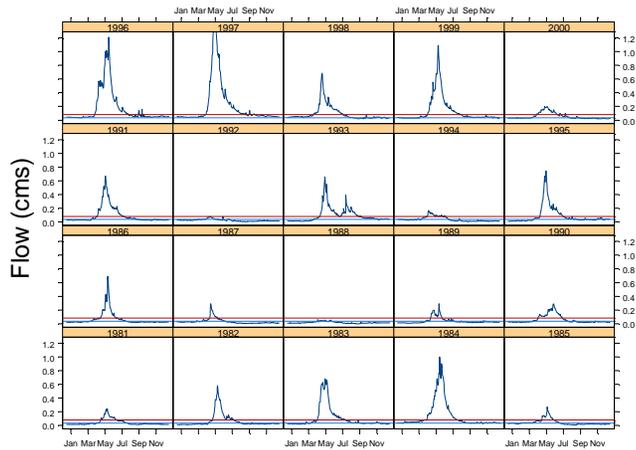
Station Name: Moyie River at Eastport
 Station ID: 08NH006
 Period of record: 1915-2000



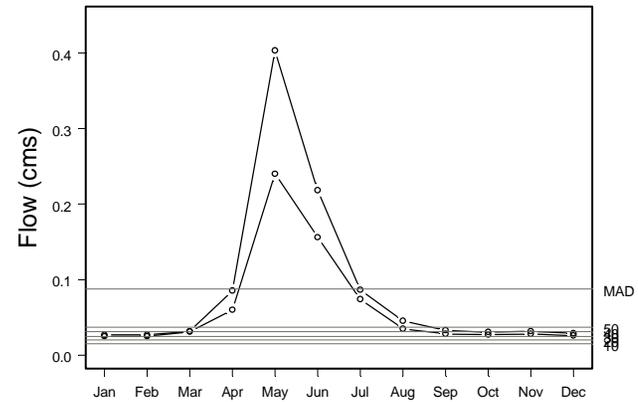
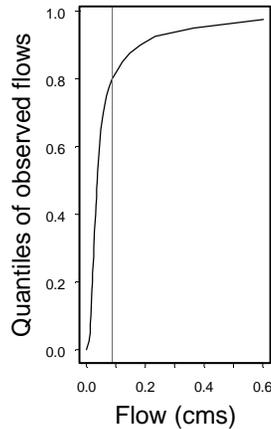
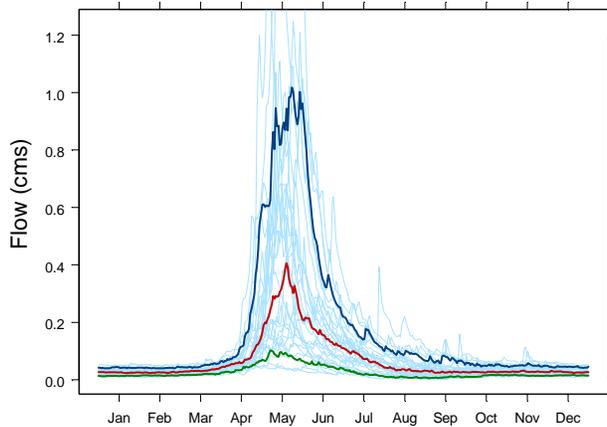
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.85	55.5	4.701347	3.68	1.84	2.27	2.78	3.2
Feb	1.25	90.3	5.158345	3.88	1.98	2.46	2.985	3.45
Mar	1.42	59.2	8.342721	5.64	2.66	3.65	4.3	4.84
Apr	2.04	173	37.27571	29.3	9.09	13.6	17.8	22.5
May	11.8	253	88.60445	81.6	43	55.2	62.9	72.5
Jun	6.14	207	55.42663	48.7	15.49	23.76	31.4	39.6
Jul	2.1	80.1	13.44741	9.77	4.22	5.49	6.74	8.1
Aug	1.22	20.3	3.887124	3.34	1.73	2.18	2.61	3
Sep	0.906	20.6	2.81621	2.38	1.47	1.67	1.87	2.1
Oct	0.85	77	4.071089	2.63	1.56	1.78	2.04	2.29
Nov	0.934	99.4	6.461873	3.85	1.9	2.35	2.8	3.28
Dec	0.991	87.8	6.160596	3.96	1.87	2.27	2.83	3.4
PoR	0.85	253	19.74193	5.18	1.93	2.55	3.272	4.11



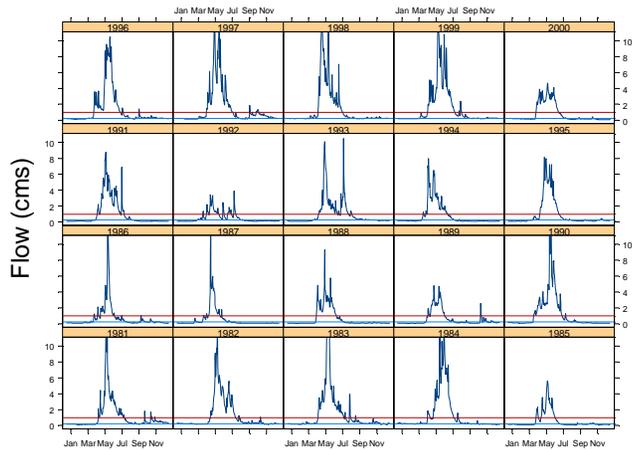
Station Name: Greata Creek near mouth
 Station ID: 08NM173
 Period of record: 1970-2000



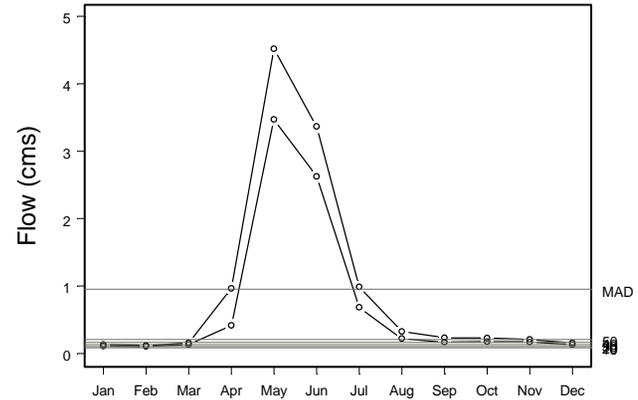
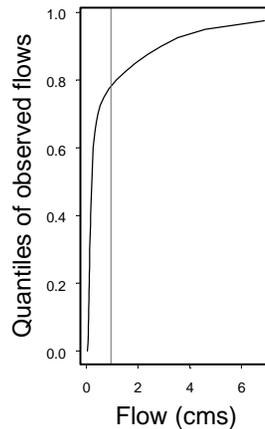
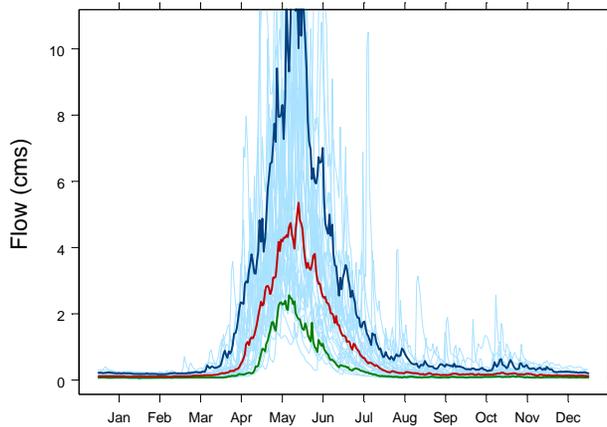
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.008	0.057	0.026744	0.025	0.013	0.015	0.0177	0.022
Feb	0.009	0.056	0.026749	0.025	0.014	0.017	0.021	0.022
Mar	0.013	0.072	0.031548	0.031	0.017	0.02	0.024	0.028
Apr	0.016	1.08	0.085321	0.06	0.0319	0.042	0.048	0.054
May	0.03	2.48	0.403241	0.24	0.076	0.11	0.143	0.1866
Jun	0.016	1.68	0.218149	0.156	0.046	0.065	0.0887	0.123
Jul	0.003	0.392	0.086419	0.074	0.019	0.029	0.0447	0.059
Aug	0.001	0.246	0.045272	0.035	0.008	0.0138	0.02	0.028
Sep	0	0.159	0.032902	0.028	0.008	0.014	0.018	0.022
Oct	0.006	0.091	0.030562	0.027	0.0129	0.018	0.021	0.024
Nov	0.01	0.113	0.031661	0.028	0.014	0.018	0.021	0.025
Dec	0.009	0.062	0.02883	0.026	0.014	0.016	0.019	0.023
PoR	0	2.48	0.087685	0.037	0.015	0.02	0.025	0.031



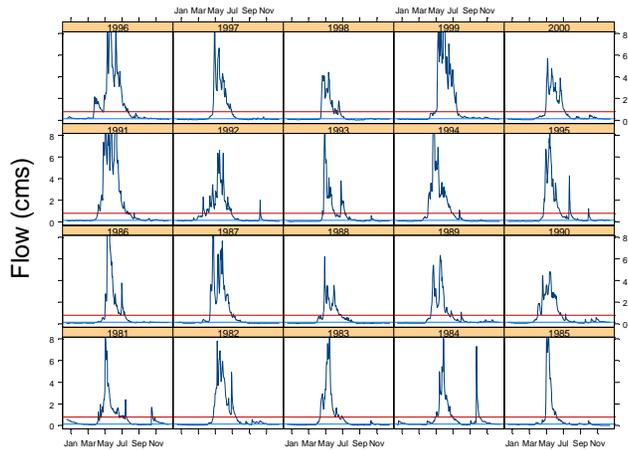
Station Name: Vaseux Creek above Solco Creek
 Station ID: 08NM171
 Period of record: 1970-2000



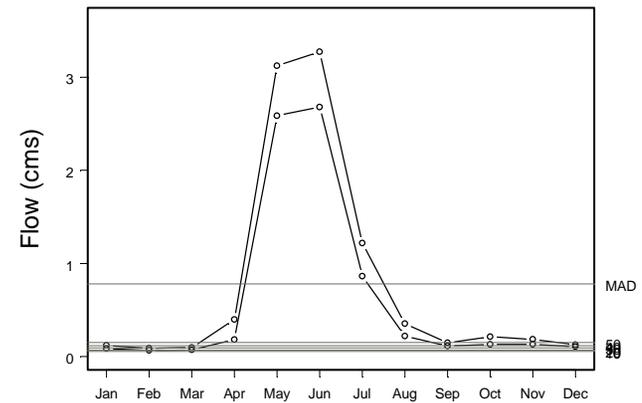
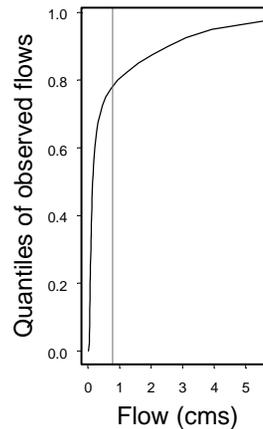
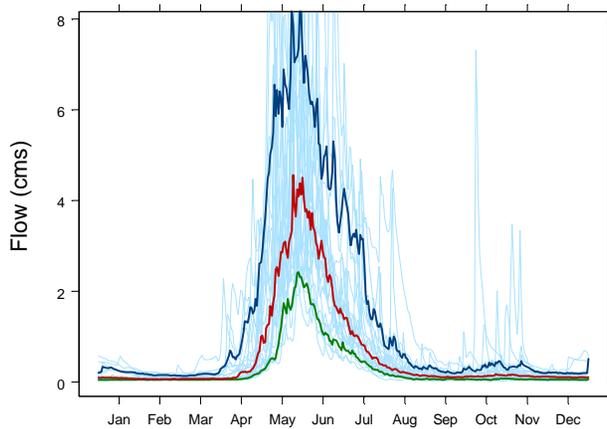
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.038	0.4	0.131326	0.11	0.065	0.079	0.091	0.101
Feb	0.033	0.285	0.117638	0.105	0.065	0.076	0.085	0.094
Mar	0.042	0.9	0.157476	0.13	0.074	0.085	0.099	0.111
Apr	0.062	7.97	0.965264	0.4165	0.122	0.1848	0.2304	0.3196
May	0.326	21.5	4.518615	3.47	1.51	2.078	2.467	2.92
Jun	0.194	17.3	3.364838	2.625	0.7195	1.208	1.74	2.176
Jul	0.079	10.5	0.988484	0.682	0.189	0.2932	0.4158	0.5228
Aug	0.048	3.95	0.326114	0.2185	0.0869	0.115	0.147	0.181
Sep	0.045	1.89	0.232691	0.168	0.0859	0.106	0.1267	0.145
Oct	0.059	2.57	0.228259	0.173	0.0889	0.1048	0.1287	0.1446
Nov	0.05	1.09	0.207546	0.17	0.084	0.103	0.12	0.1416
Dec	0.045	0.587	0.156126	0.13	0.082	0.093	0.103	0.118
PoR	0.033	21.5	0.953095	0.2055	0.085	0.105	0.129	0.163



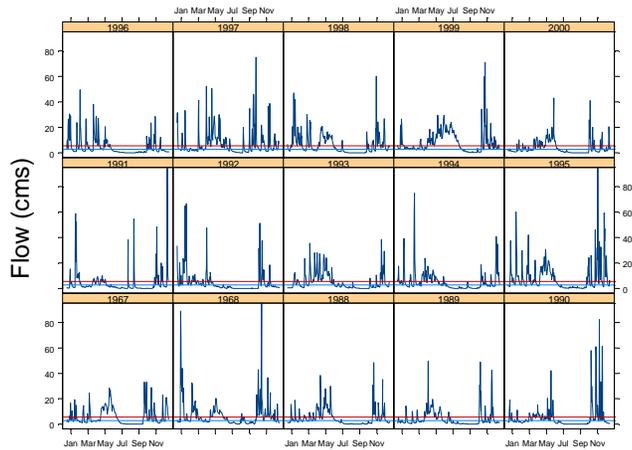
Station Name: Lingfield Creek at mouth
 Station ID: 08MA006
 Period of record: 1974-2000



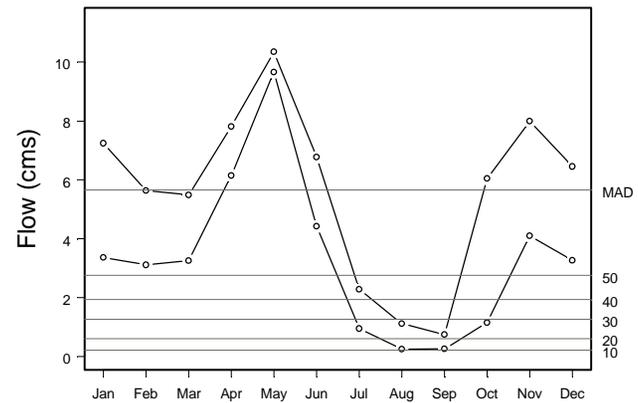
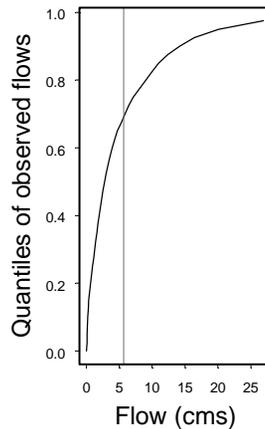
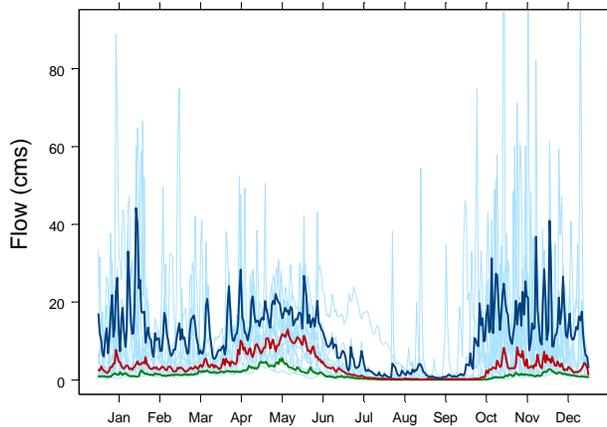
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.023	0.58	0.119062	0.085	0.045	0.055	0.065	0.072
Feb	0.03	0.37	0.08708	0.065	0.051	0.054	0.057	0.06
Mar	0.038	0.588	0.096386	0.07	0.048	0.054	0.059	0.064
Apr	0.042	4.47	0.39566	0.18	0.059	0.0698	0.082	0.1122
May	0.15	15.7	3.121356	2.585	0.484	0.986	1.69	2.18
Jun	0.493	14	3.272401	2.68	1.13	1.51	1.89	2.31
Jul	0.074	7.02	1.216969	0.8625	0.336	0.467	0.579	0.722
Aug	0.034	4.67	0.352561	0.2185	0.088	0.127	0.153	0.18
Sep	0.025	1.11	0.14511	0.1125	0.057	0.071	0.086	0.1026
Oct	0.02	7.31	0.210986	0.13	0.055	0.08	0.1045	0.116
Nov	0.019	3.48	0.183367	0.13	0.0569	0.074	0.092	0.116
Dec	0.019	0.69	0.12463	0.1045	0.052	0.06	0.078	0.094
PoR	0.019	15.7	0.779858	0.15	0.055	0.069	0.092	0.116



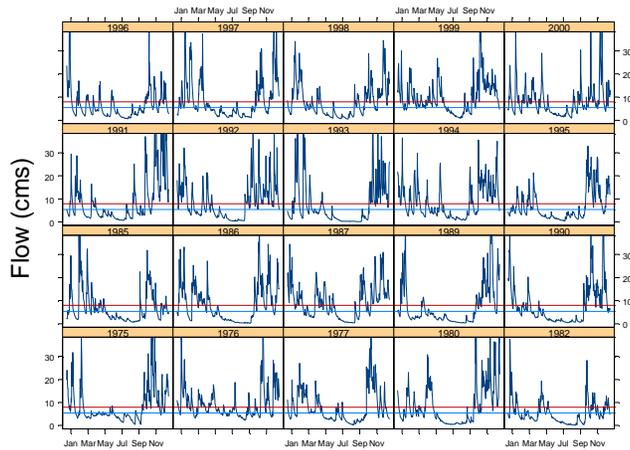
Station Name: Browns River near Courtenay
 Station ID: 08HB025
 Period of record: 1960-2000



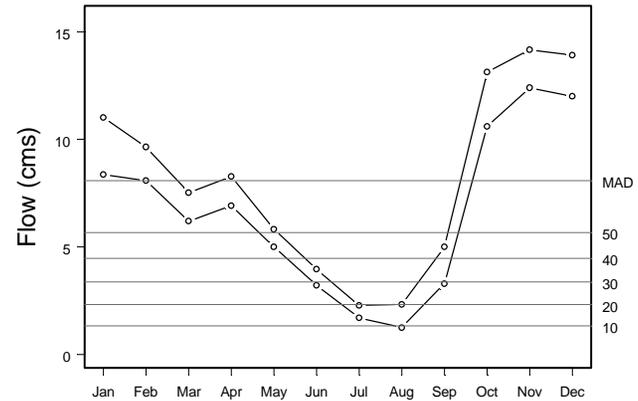
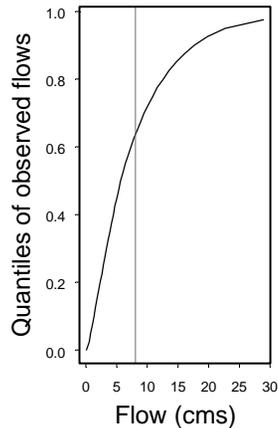
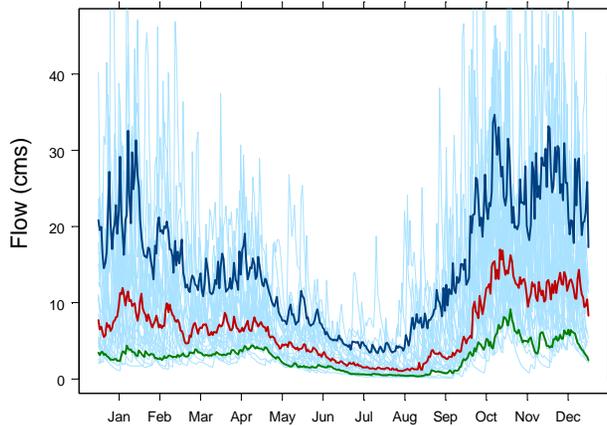
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0.38	88.9	7.240351	3.36	0.9346	1.56	2.032	2.64
Feb	0.485	66.5	5.635835	3.11	1.25	1.7	2.112	2.62
Mar	0.614	74.9	5.485563	3.25	1.482	1.946	2.392	2.756
Apr	1.39	52.4	7.813111	6.15	2.17	2.618	3.43	4.724
May	1.29	50.6	10.3503	9.66	3.474	4.906	6.276	7.996
Jun	0.222	43.1	6.777424	4.42	1.056	1.63	2.517	3.4
Jul	0.088	24	2.275834	0.943	0.2398	0.3708	0.5152	0.668
Aug	0.023	54.5	1.118187	0.245	0.0904	0.139	0.164	0.1896
Sep	0.05	36.2	0.740091	0.2545	0.074	0.101	0.1371	0.1956
Oct	0.062	183	6.043077	1.15	0.119	0.1998	0.3026	0.6018
Nov	0.191	104	7.996331	4.1	1.149	1.634	2.27	3.03
Dec	0.56	101	6.451445	3.26	1.194	1.588	2	2.46
PoR	0.023	183	5.658937	2.75	0.2169	0.6078	1.26	1.93



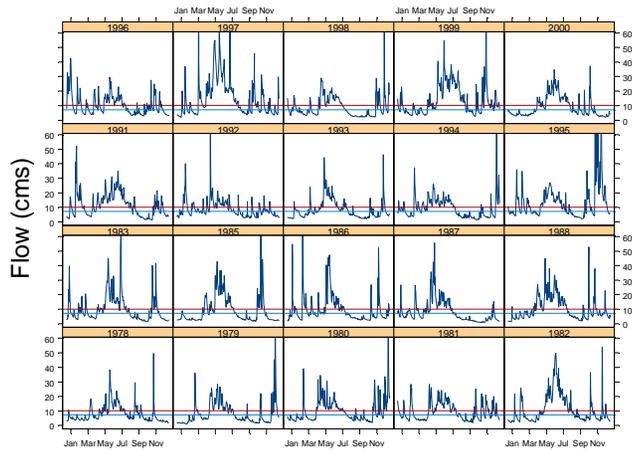
Station Name: Pallant Creek near Queen Charlotte
 Station ID: 08OB002
 Period of record: 1962-2000



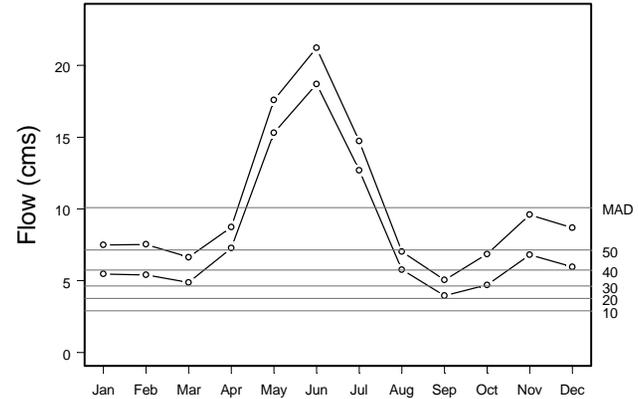
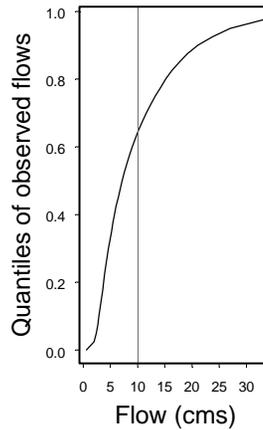
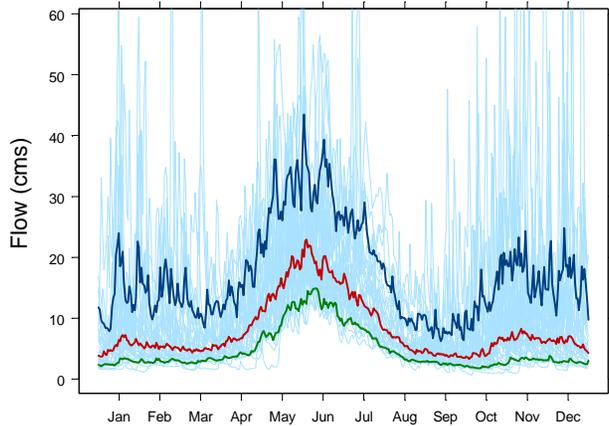
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	1.08	63.8	11.01659	8.36	2.8	3.94	5.08	6.42
Feb	1.31	46.9	9.645068	8.085	2.751	3.866	5.18	6.588
Mar	1.53	36.4	7.519132	6.2	3.105	3.89	4.575	5.38
Apr	1.91	37.4	8.269295	6.915	3.629	4.414	5.164	5.91
May	1.35	26.8	5.825893	4.995	2.155	2.81	3.485	4.39
Jun	0.663	25.4	3.960483	3.215	1.439	1.81	2.221	2.75
Jul	0.263	18.7	2.278797	1.705	0.645	0.852	1.12	1.4
Aug	0.209	25.1	2.327823	1.25	0.428	0.577	0.7775	1
Sep	0.115	46.6	5.002013	3.29	0.7841	1.38	1.87	2.596
Oct	0.814	93.4	13.12636	10.6	3.78	5.28	6.955	8.61
Nov	0.816	67.7	14.16393	12.4	5.059	7.296	9.037	10.6
Dec	1.51	73.7	13.9148	12	4.64	6.36	7.95	10.3
PoR	0.115	93.4	8.078319	5.675	1.33	2.33	3.37	4.47



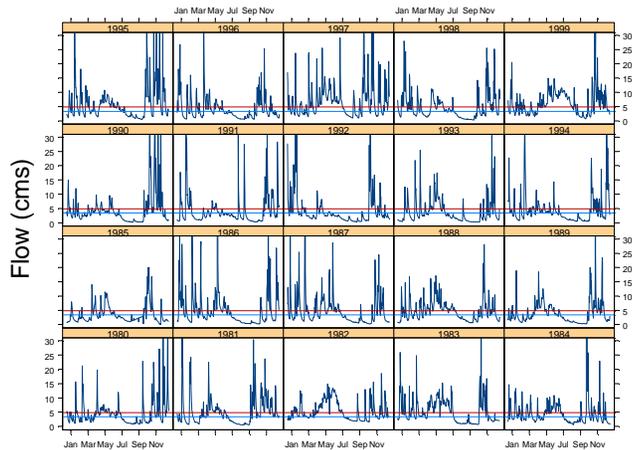
Station Name: Slease Creek near Vedder Crossing
 Station ID: 08MH056
 Period of record: 1957-2000



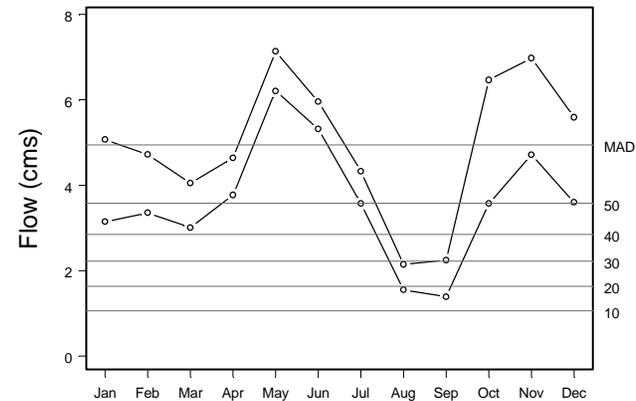
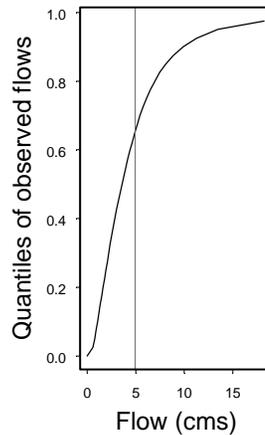
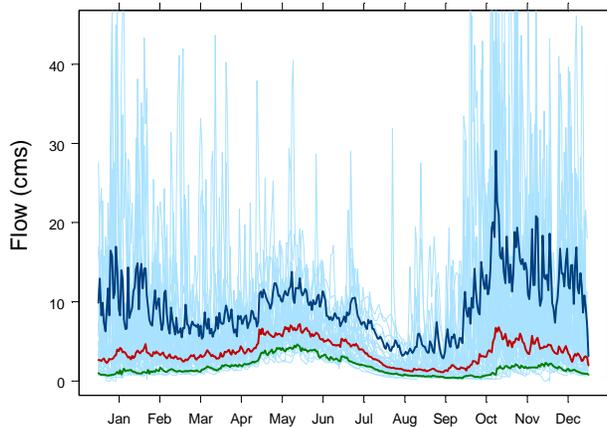
	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	1.35	63.4	7.493548	5.47	2.494	3	3.74	4.64
Feb	1.1	62	7.534014	5.41	2.826	3.47	3.91	4.53
Mar	1.42	87.9	6.641705	4.87	2.872	3.37	3.82	4.276
Apr	1.56	70	8.735295	7.285	3.71	4.444	5.1	6.152
May	1.59	59.5	17.59353	15.3	8.204	10.2	11.9	13.6
Jun	6.31	70.8	21.22511	18.7	12.39	14.2	15.6	16.9
Jul	4.64	68.9	14.72223	12.7	7.144	8.736	10.1	11.4
Aug	1.42	33.8	7.027677	5.77	3.374	3.958	4.534	5.156
Sep	1.08	47.6	5.049905	3.96	2.45	2.82	3.16	3.57
Oct	0.629	70.7	6.857485	4.7	2.004	2.528	2.972	3.698
Nov	0.971	117	9.602492	6.805	3.11	4.046	4.974	5.796
Dec	1.43	113	8.690092	5.96	2.764	3.57	4.232	5.1
PoR	0.629	117	10.10545	7.14	2.89	3.77	4.64	5.75



Station Name: Heber River, Vancouver Island (immediately u/s of diversion)
 Station ID: BC Hydro inflow file
 Period of record: 1959 – 1999



	min	max	mean	median	ptile.10	ptile.20	ptile.30	ptile.40
Jan	0	47.08764	5.069694	3.147458	0.895871	1.309415	1.848085	2.501275
Feb	0.187911	43.29507	4.718673	3.35239	1.181069	1.766469	2.29571	2.766563
Mar	0.746149	43.66126	4.048879	3.006253	1.323277	1.724271	2.171526	2.551848
Apr	1.249786	40.23538	4.63781	3.770779	2.000358	2.398829	2.781599	3.275605
May	2.180343	40.41092	7.136397	6.208185	3.814607	4.496392	5.077272	5.625065
Jun	1.499534	28.67031	5.95794	5.318312	2.989726	3.772644	4.249345	4.772013
Jul	0.640986	29.0716	4.326151	3.570794	1.767692	2.211115	2.610607	3.062785
Aug	0.215179	31.92282	2.143527	1.551393	0.712694	0.928686	1.125211	1.308075
Sep	0.158509	33.43727	2.241486	1.384432	0.477172	0.670809	0.882921	1.076805
Oct	0.103503	64.27372	6.462372	3.570099	0.683653	1.048487	1.609689	2.425936
Nov	0	52.76284	6.978078	4.713073	1.716782	2.420946	3.137511	3.850869
Dec	0	46.10985	5.591094	3.598205	1.278619	1.709728	2.198457	2.849385
PoR	0	64.27372	4.944243	3.576647	1.057249	1.628634	2.218149	2.84517



APPENDIX B.
METHODS USED TO DEVELOP AND EVALUATE
THE RECOMMENDED FLOW THRESHOLDS

As noted in the main body of this report, formal and informal techniques were used to evaluate a variety of potential “coarse filters” for reviewing water license applications on British Columbia streams. These evaluations led to an attempt to develop a standard-setting technique using historic flow data, a technique that we ultimately recommend. The recommendations are based on a variety of analyses of historic flow data from around BC. The methods used in the analysis are presented in this appendix.

Methods

Nineteen sites on BC streams were selected for investigation (Table B 1). These sites have long-term historic flow records, and represent several geoclimatic regions and a range of stream sizes. Flow records (mean daily flows) were extracted from Water Survey of Canada HYDAT database, and used to investigate the effects of different diversion scenarios. We have assumed that surface flows at these sites are relatively unaffected by water or land uses, so we made no attempt to “naturalize” the records.

The modeling of different diversion scenarios started with several assumptions about riverine ecology and capacity of engineered diversion works. These assumptions are discussed in greater detail in the main body of this report, but are summarized here.

1. We assumed that in the absence of biological and physical information it is difficult to predict changes to natural flow patterns that would benefit fish. We assumed that if fish are present in a stream it is because they are able to withstand the flow regime there, or are specifically adapted to it. The most logical strategy therefore is to preserve the key features of its natural hydrograph, which affect fish both directly (e.g., hydraulically suitable habitat) and indirectly (e.g., geomorphology, riparian habitat).
2. We assumed that low flow periods are a common bottleneck to fish production in streams. For example, low flows during summer may limit available rearing habitat and low flows during winter may limit availability of overwintering habitat and ice-free refuges. These periods should therefore be targeted for the greatest level of protection against water abstraction.
3. We assumed that flows additional to those during the low flow period may be directly beneficial to fish, but that the benefit does not accrue in a linear relationship. For this reason, naturally low flow periods should receive greater protection against water abstraction than naturally high flow periods.
4. We assumed that high flow events are important for determining stream morphology and sediment dynamics in streams. For this reason, aspects of high flow events should be maintained in a regulated stream.
5. We assumed that most diversion projects have a maximum diversion rate considerably less than the maximum available flow. The maximum diversion rate is usually an economic decision based on the cost the physical diversion works (e.g., penstock) in relation to the frequency of available flows. As a rule of thumb we assumed that maximum diversion for run of river hydropower projects is roughly 100 – 150% of mean annual discharge. After examining flow duration curves for our test streams (see Appendix A) we set maximum diversion capacity equivalent to 80th percentile flow over the period of record, which is always greater than MAD. We assume that this flow is a reasonable approximation for most projects.

Existing historic flow methods. There are a number of standards based on historic flow data that have been developed for use in other jurisdictions (see Section 10.2). King et al. (1999) noted that there are at least 15 frequently referenced, hydrology-based methodologies, but many are region- and/or context-specific in their application. Jowett (1997), Dunbar et al. (1998), King et al. (1999) and Instream Flow Council (2002) review many of these methods (e.g., Basque, Hoppe, Lyon, New England base flow, Northern Great Plains, Tennant, and 7Q10 methods).

We evaluated several of the existing historic flow methods as potential “coarse filters” for reviewing water use applications on BC streams. Some methods (e.g., Tennant and modified-Tennant methods) were subjected to formal and informal peer review processes during Phase I and II of this project. A set of the existing methods (Hoppe, Lyon, New England base flow, and Northern Great Plains methods) were assessed by modeling pre- and post-project hydrographs for a set of streams.

Fish-bearing streams. Based on the above assumptions we developed a minimum flow that could be applied to all streams. The rule was developed by examining flow patterns during the periods of lowest flows. The low flow period was defined as the calendar month with the lowest median of mean daily flows. (Due to the highly skewed nature of most flow records we used percentiles and medians rather than means to describe flow periods and to develop protection levels.) We then plotted historic flow patterns in our suite of test streams during the low flow months (see figures at end of this Appendix). We asked how different percentiles of daily flows would perform as the minimum flow order during that month. In general, we observed that the 90th percentile flow within the low flow month would clip occasional flow spikes, but did a reasonably good job of protecting the base flow. The performance of this statistic was assessed qualitatively only.

After setting the 90th percentile as the protection level for the low flow month we set a level of protection for the highest flow month, and examined how protection levels might vary in months other than the highest and lowest flow month. We arbitrarily set the protection level for the high flow month at the 20th percentile flow within that month. For each of our test streams we then plotted median monthly flows in order, from lowest to highest (see figures at end of this Appendix). These plots indicated considerable variance in the pattern of monthly flows, from simple power functions to linear functions, indicating that there was no single function that would describe the pattern of monthly median flows for the set of test streams. We therefore decided to let the protection level vary from 90th to 20th percentile depending on the difference between the median flow in any month and the median flow in the lowest flow month. The protection level for each month can thus be described by,

$$90 - \left[\left(\frac{\text{median}_i - \text{median}_{\min}}{\text{median}_{\max} - \text{median}_{\min}} \right) \times (90 - 20) \right]$$

where

median_i is the median of mean daily flows for month i ,

median_{\min} is the minimum of monthly medians,

median_{\max} is the maximum of monthly medians.

Using this formula the percentile will vary between 20th and 90th.

Regulated flows were then modeled on a daily time step using the above diversion rules. We assumed that diversions would occur regardless of whether flows were sufficient for power generation. This simplified the modeling and is consistent with the operating rules of many facilities. (When the diversion section has higher fisheries values than the downstream section, then facilities and regulators may decide that flows less than the minimum turbine capacity should be released at the upper end of the diversion section rather than diverted through the penstocks and released at the bottom. The diversion rule we modeled assumes that downstream fisheries values tend to be higher than those in the diversion section.)

Simulated regulated flows were then compared to unregulated flows using a variety of graphing and statistical techniques. Multipanel plots were used to qualitatively compare pre- and post-project flows, and quantile plots were used to compare exceedences between flow regimes. Pre- and post-project flows were compared quantitatively using the RVA statistics (Richter et al. 1997), and the number of days during the period of record exceeding thresholds proposed by Tennant, the BC modified-Tennant method, and the PHABSIM meta-analysis.

The same procedure of rule development and evaluation was used to examine other diversion rules as potential hydrologically-based standards. In particular, we sought to develop rules that were less complex. For example, we modeled and evaluated the following two rules, which we refer to as rule 2 and 3 for simplicity.

rule 2

1. maximum diversion rates equivalent to 80th percentile flow over the period of record.
2. minimum instream flows determined by median flow during each calendar month.
3. if median flow for month x is greater than the median flow for the period of record then the minimum instream flow for that month is 20th percentile.
4. if median flow for month x is less than the median flow for the period of record then the minimum instream flow for that month is 90th percentile.

rule 3

1. maximum diversion rates equivalent to 80th percentile flow over the period of record.
2. minimum instream flows determined by median flow during each calendar month.
3. if median flow for month x is greater than the median flow for the period of record then the minimum instream flow for that month is 20th percentile.
4. if median flow for month x is less than the 10th percentile flow for the period of record then the minimum instream flow for that month is 90th percentile.
5. if median flow for month x is less than the 20th percentile flow for the period of record and greater than the 10th percentile flow then the minimum instream flow for that month is 80th percentile.
6. if median flow for month x is less than the 30th percentile flow for the period of record and greater than the 20th percentile flow then the minimum instream flow for that month is 70th percentile.
7. if median flow for month x is less than the 40th percentile flow for the period of record and greater than the 30th percentile flow then the minimum instream flow for that month is 60th percentile.

8. if median flow for month x is less than the 50th percentile flow for the period of record and greater than the 40th percentile flow then the minimum instream flow for that month is 50th percentile.

Fishless streams. The primary objective of the flow standard on fishless streams is to protect invertebrate production for downstream fish populations. We developed a rule for minimum acceptable flow in fishless streams using some of the same logic as for fish-bearing streams. However, a key difference is that we assumed that risk to fish production is lower on a fishless stream than on a fish-bearing stream, and therefore were willing to accept higher diversion rates. Based on reviews in Sections 7.0 and 9.0 and discussions held during workshops we assume that there are benefits to downstream fish producing areas including export of detritus and invertebrate drift, important components of food webs in streams. We therefore recommend against full diversion.

The proposed minimum flow standard of median monthly flow during the low flow month, is based on the knowledge that this is a frequently observed naturally occurring low flow. Given the aim of protecting invertebrate production for downstream fish populations, the standard should not drastically impinge on flows during naturally low flow periods, an often hypothesized bottleneck in invertebrate production in streams. We assume that the minimum flow will provide sufficient connectivity to maintain local invertebrate production and export of drift and detritus. Finally, the standard assumes that run-of-river water use projects will utilize a maximum diversion equivalent to no greater than the 80th percentile of daily flows over the period of record. If this assumption is satisfied then flows in excess of this amount will remain in the diversion section and provide (albeit with lower frequency and duration) physical forces necessary to maintain overall stream morphology, and instream and riparian habitat.

Results

Hydrometric data. Graphical comparisons of low flow months are presented at the end of this Appendix. There are three plots for each of our test streams (see Table B 1 for list of streams). The first (i.e., left plot) is a multipanel plot that shows time series of mean daily flows during the low flow month; the plots show patterns for nine years from the period of record. Quantile plots (middle) show the proportion of time that flows are greater than a specific value (i.e., exceedences) during the low flow month over the period of record. The grey vertical line is the mean discharge during the low flow month. The right-hand plots show mean daily discharge during the low flow month with all years from the period of record superimposed. Horizontal lines indicate specific percentiles for mean daily flows in the low flow month over the period of record.

A second series of plots summarizes monthly data for our test streams. The plots show medians of mean daily flows for each calendar month, plotted in ascending order. The plots indicate broad differences among streams.

Existing historic flow methods. Some methods (e.g., 7Q10) were rejected based solely on reviews in the literature (e.g., Dunbar et al. 1998; King et al. 1999; Instream Flow Council 2002). Other methods (e.g., Tennant and modified-Tennant methods) were rejected during formal and

informal peer review processes during Phase I and II of this project. Still other methods (Hoppe, Lyon, New England base flow, and Northern Great Plains methods) were rejected based on a combination of literature review and modeling of pre- and post-project flows. In general, these methods were rejected either because they were deemed to be too risky in terms of amount of water diverted, or as having inappropriate timing rules for diversion. Based on these assessments we pursued alternative diversion rules.

Fish-bearing streams. Graphical comparisons of natural and simulated regulated flows using the proposed fish-bearing diversion rule are presented in Appendix C. Statistical summaries comparing natural and simulated regulated flows are presented in Appendix D. For simplicity we present only results from the fish-bearing stream “rule 1.” Rule 2 and 3 performed substantially less well, so these results are not included here, but are available upon request.

Graphical comparisons indicate that the fish-bearing stream rule does a good job of preserving general features of the natural hydrograph. Comparison of statistical summaries also indicates that the rule performs well relative to several other existing standards. Results indicate however that the proposed fish-bearing stream diversion rule seems to perform least well on small streams. As indicated in Table B 1, the diversion rule results in different diversion amounts for different streams depending on the prevailing hydrologic regime. The average diversion is approximately 22% of available streamflow, but ranges from 12.5% to 32% for our set of test streams.

Table B 1. Summary of diversion and instream flows when the fish-bearing stream flow threshold is applied to a set of test streams. Sum natural flow, sum regulated flow, and sum diverted flow are total mean daily flows for the period of record. Units of flow are cms days; multiply by 86400 (i.e., no. of seconds in a day) to obtain total volume over period of record. Sum diverted flow / sum natural flow is the proportion of total flow that is available for diversion. Thus, under this rule diversion flow ranges from 12% to 32% for our group of test streams, and on average allows approximately 22% of flows to be diverted.

Region	Gauge no.	Gauge name	Period of record	sum natural flow	sum regulated flow	sum diverted flow	sum diverted / sum natural
Coastal, Dry	08HA016	Bings Creek near mouth	1961 - 2000	5683	4125	1558	27.4%
Coastal, Dry	08HA001	Chemainus River near Westholme	1914 - 2000	318000	217000	101000	31.8%
Coastal, Dry	08HB025	Browns River near Courtenay	1960 - 2000	31011	21857	9154	29.5%
Coastal, Wet	BCH inflow file	Heber River u/s of diversion	1959 - 1999	74040	54199	19841	26.8%
Coastal, Wet	08HB048	Carnation Creek at the mouth	1973 - 2000	8436	5784	2652	31.4%
Coastal, Wet	08MH056	Sleese Creek near Vedder Crossing	1957 - 2000	129000	103000	25700	19.9%
Coastal, Wet	08OB002	Pallant Creek near Queen Charlotte	1962 - 2000	76712	52544	24168	31.5%
Interior, Dry	08LB072	Louis Creek at mouth	1971 - 1996	23867	20567	3300	13.8%
Interior, Dry	08LB078	Lemieux Creek at mouth	1977 - 2000	24786	21064	3722	15.0%
Interior, Dry	08NL070	Similkameen River above Goodfellow	1974 - 2000	72122	57439	14683	20.4%
Interior, Dry	08NL007	Similkameen River near Princeton	1914 - 2000	516000	419000	96600	18.7%
Interior, Dry	08NM173	Greata Creek near mouth	1970 - 2000	961	842	119	12.4%
Interior, Dry	08NM171	Vaseux Creek above Solco Creek	1970 - 2000	10444	8828	1616	15.5%
Interior, Dry	08MA006	Lingfield Creek at mouth	1974 - 2000	7406	6020	1386	18.7%
Interior, Wet	08NE039	Big Sheep Creek near Rossland	1929 - 2000	107000	88200	18900	17.6%
Interior, Wet	08NH006	Moyie River at Eastport	1915 - 2000	512000	421000	91100	17.8%
Interior, Wet	08PA001	Skagit River near Hope	1915 - 1955	259000	207000	51400	19.9%
Interior, Wet	08MF062	Coquihalla River below Needle Creek	1965 - 2000	33407	25739	7668	23.0%
Interior, Wet	08MF003	Coquihalla River near Hope	1911 - 1983	258000	200000	57600	22.3%

Fishless streams. Graphical comparisons of natural and simulated regulated flows using the fishless stream diversion rule are presented in Appendix E. Statistical summaries from comparing natural and simulated regulated flows are presented in Appendix F.

The graphical comparisons indicate that the fishless stream rule results in substantial hydrologic alteration. In general, low flow events are more frequent and of longer duration, and high flow events are less frequent, shorter duration, and of lower magnitude. The hydrologic changes are evident when comparing RVA statistics for simulated pre- and post-project flows. These hydrologic alterations were anticipated.

Like the fish-bearing stream rule, the fishless stream diversion rule results in different diversion amounts for different streams depending on the prevailing hydrologic regime (Table B 2). The average diversion is approximately 48% of available streamflow, but ranges from 30% to 69% for our set of test streams.

Table B 2. Summary of diversion and instream flows when the recommended fishless stream threshold is applied to a set of test streams. (Note: the purpose is to understand the effects of the diversion rule; in reality each of these streams is likely fish-bearing.) Sum natural flow, sum regulated flow, and sum diverted flow are totals of mean daily flows for the period of record. Units of flow are cms days; multiply by 86400 (i.e., no. of seconds in a day) to obtain total volume over period of record. Sum diverted flow / sum natural flow is the proportion of total flow that is available for diversion. Thus, under this rule diversion as a proportion of available flow ranges from 30% to 69% with a mean of 48% for our group of test streams.

Region	Gauge no.	Gauge name	Period of record	sum natural flow	sum regulated flow	sum diverted flow	sum diverted / sum natural
Coastal, Dry	08HA016	Bings Creek near mouth	1961 - 2000	5683	2824	2859	50.3%
Coastal, Dry	08HA001	Chemainus River near Westholme	1914 - 2000	318000	121000	197000	62.1%
Coastal, Dry	08HB025	Browns River near Courtenay	1960 - 2000	31011	10757	20254	65.3%
Coastal, Wet	BCH inflow file	Heber River u/s of diversion	1959 - 1999	74040	32238	41802	56.5%
Coastal, Wet	08HB048	Carnation Creek at the mouth	1973 - 2000	8436	4487	3949	46.8%
Coastal, Wet	08MH056	Sleese Creek near Vedder Crossing	1957 - 2000	129000	62100	67100	51.9%
Coastal, Wet	08OB002	Pallant Creek near Queen Charlotte	1962 - 2000	76712	23849	52863	68.9%
Interior, Dry	08LB072	Louis Creek at mouth	1971 - 1996	23867	15250	8617	36.1%
Interior, Dry	08LB078	Lemieux Creek at mouth	1977 - 2000	24786	14445	10341	41.7%
Interior, Dry	08NL070	Similkameen River above Goodfellow	1974 - 2000	72122	40922	31200	43.3%
Interior, Dry	08NL007	Similkameen River near Princeton	1914 - 2000	516000	312000	204000	39.5%
Interior, Dry	08NM173	Greata Creek near mouth	1970 - 2000	961	669	292	30.3%
Interior, Dry	08NM171	Vaseux Creek above Solco Creek	1970 - 2000	10444	6718	3726	35.7%
Interior, Dry	08MA006	Lingfield Creek at mouth	1974 - 2000	7406	4659	2748	37.1%
Interior, Wet	08NE039	Big Sheep Creek near Rossland	1929 - 2000	107000	56400	50600	47.3%
Interior, Wet	08NH006	Moyie River at Eastport	1915 - 2000	512000	279000	233000	45.5%
Interior, Wet	08PA001	Skagit River near Hope	1915 - 1955	259000	130000	129000	49.9%
Interior, Wet	08MF062	Coquihalla River below Needle Creek	1965 - 2000	33407	16011	17396	52.1%
Interior, Wet	08MF003	Coquihalla River near Hope	1911 - 1983	258000	115000	143000	55.5%

Discussion

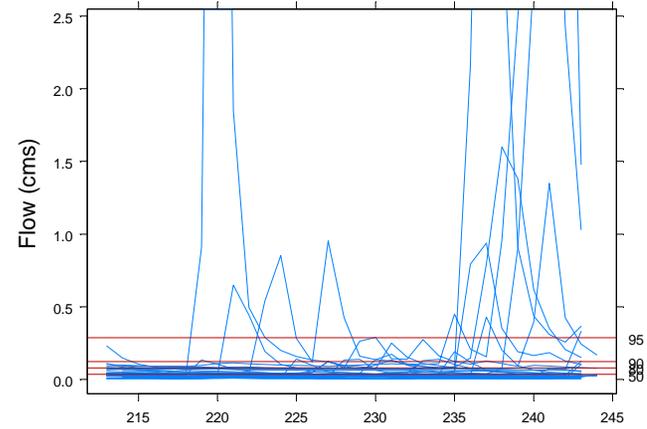
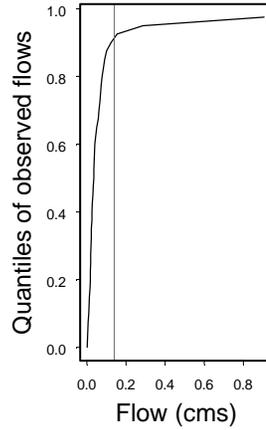
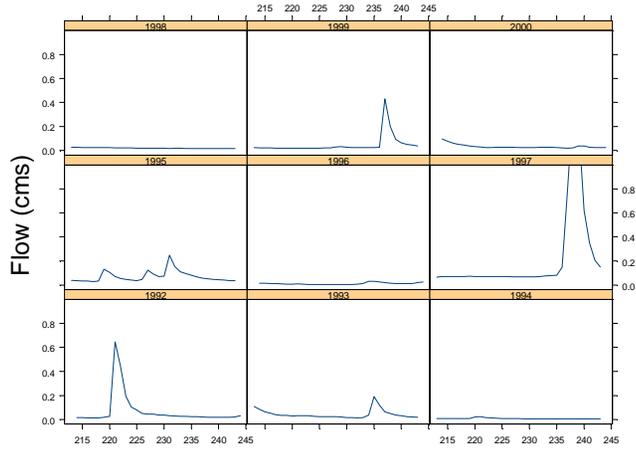
Based on a review of potential standard-setting methods during Phases I and II of this project, we pursued the development of a standard based on historic flow data. Existing standards based on this approach (Hoppe, Lyon, New England base flow, and Northern Great Plains methods) had sufficient disadvantages to warrant rejection as screening tools for water

development on BC streams. The method developed and recommended here applies a sliding scale of diversion criteria based on fish presence or absence and pattern of median monthly flows. Considerably more water is made available on fishless streams than on fish-bearing streams. On the latter, the sliding scale of diversion criteria ensure that low flow periods receive greater protection than high flow periods.

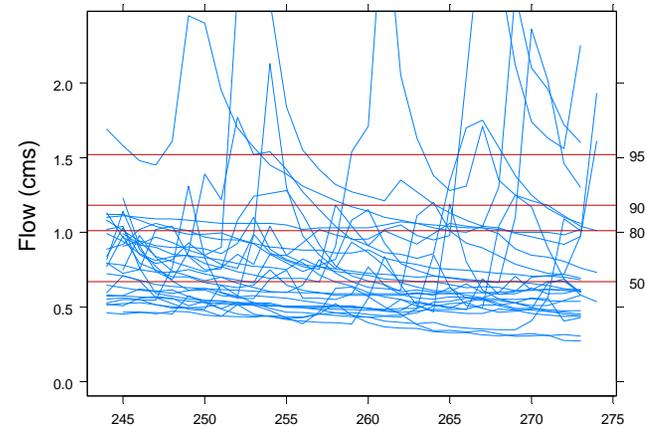
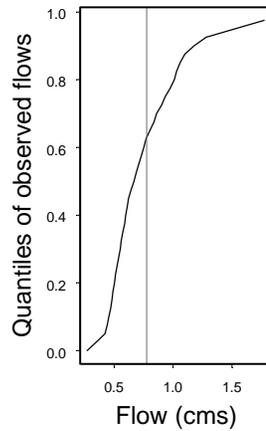
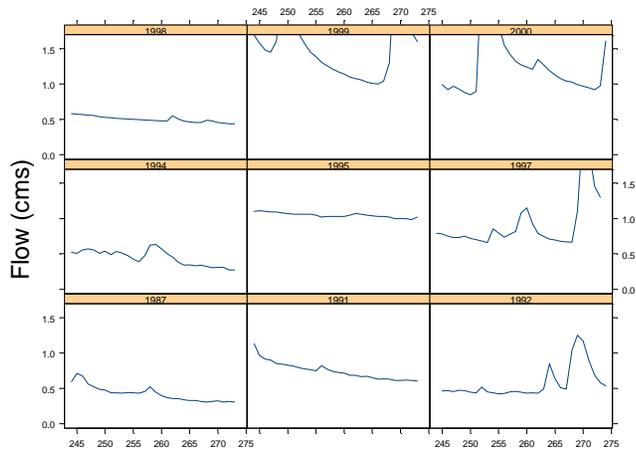
Results from modeling both fishless and fish-bearing rules indicate that more water is available for development in coastal rain dominated systems than interior snowmelt driven streams, although the discrepancy between coastal and interior systems is considerably less for the fishless stream rule. Based on the modeling of these diversion rules, coastal systems may be more appropriate for small hydropower development than interior streams.

The performance of the recommended standards were assessed against multiple criteria, including RVA statistics, and criteria from Tennant, BC modified-Tennant, and PHABSIM meta-analysis. Performance as measured against these criteria has been quantified (see Appendices D and F), but whether the Standards provide sufficient protection for fish is ultimately a subjective decision. Our conclusion is that the recommended Standards perform well as tools for screening proposed water uses on BC streams. For fish-bearing streams the diversion rules allow almost $\frac{1}{4}$ of available flows to be diverted on average, yet results indicate that alterations to the flow regime are nevertheless meeting the objective of low risk changes to fish habitat. For fishless streams, the diversion rules allow almost $\frac{1}{2}$ of available flows to be diverted on average, yet maintain specific aspects of the natural hydrograph believed to be important for delivering local production to downstream fish habitat.

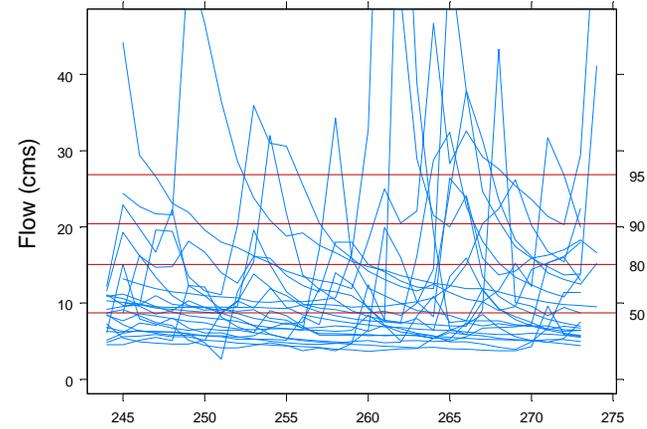
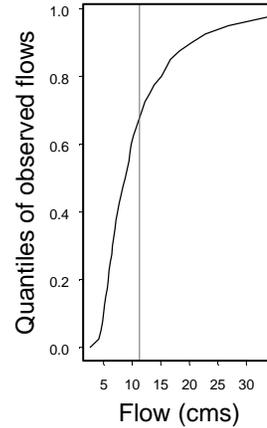
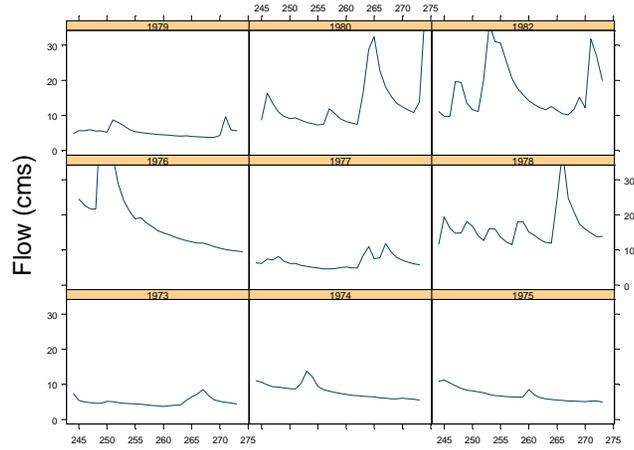
Station Name: Carnation Creek at the mouth
 Station ID: 08HB048
 Period of record: 1973-2000
 low flow month = Aug



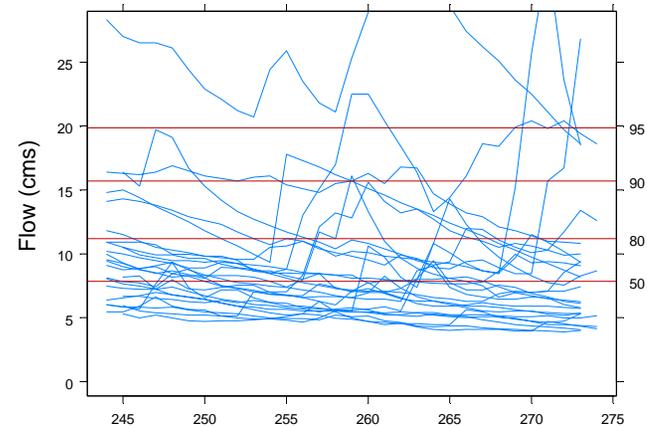
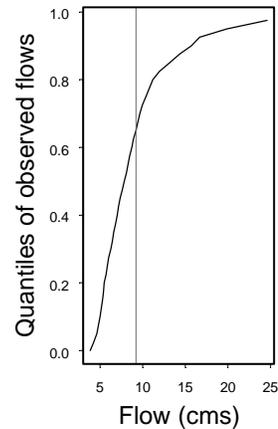
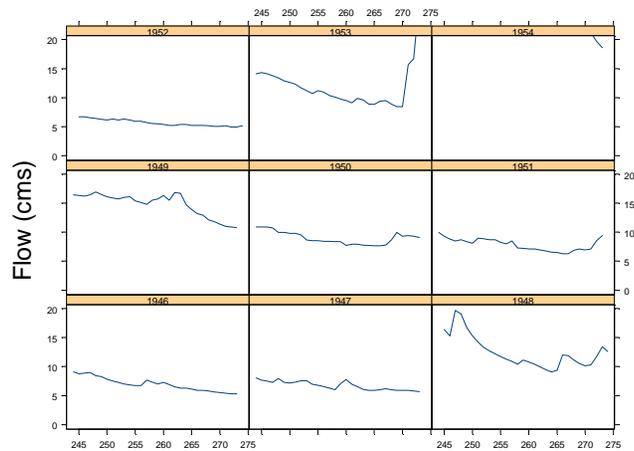
Station Name: Coquihalla below Needle Creek
 Station ID: 08MF062
 Period of record: 1965-2000
 low flow month = Sep



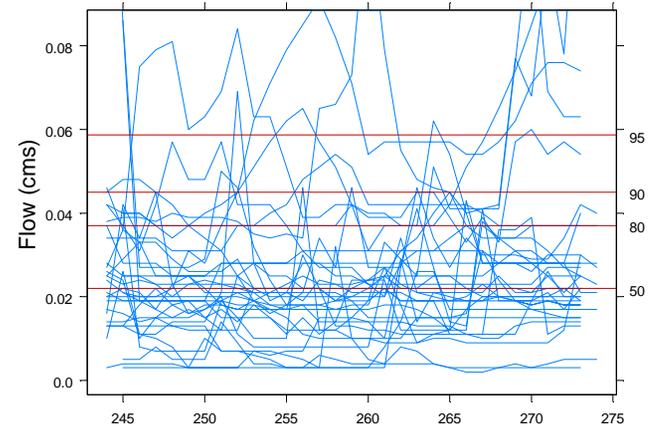
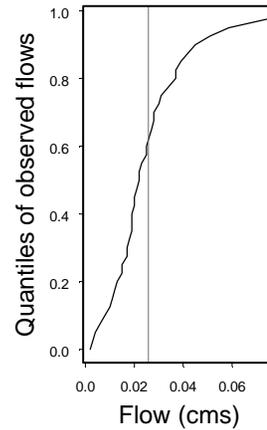
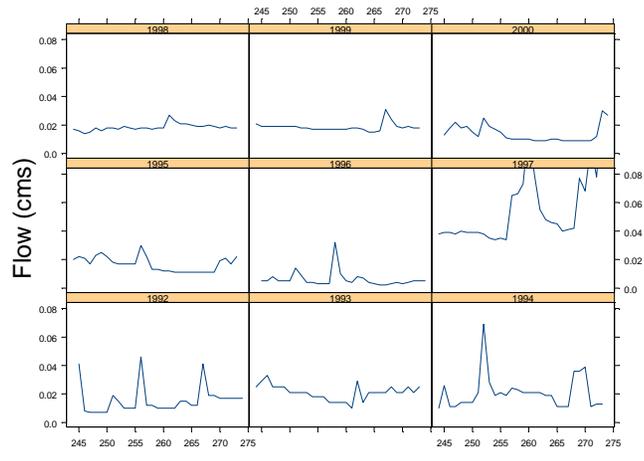
Station Name: Coquihalla near Hope
 Station ID: 08MF003
 Period of record: 1911-1983
 low flow month = Sep



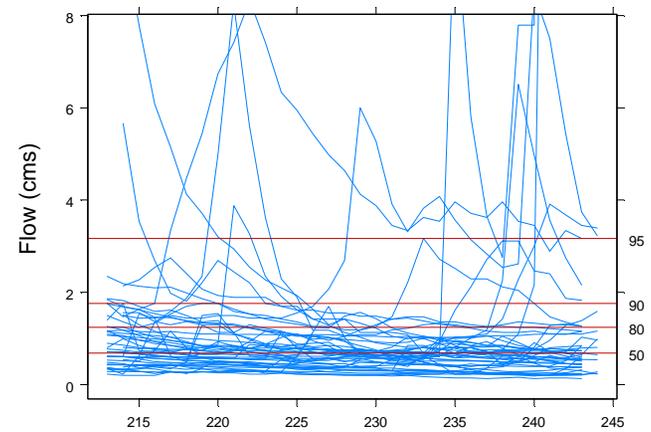
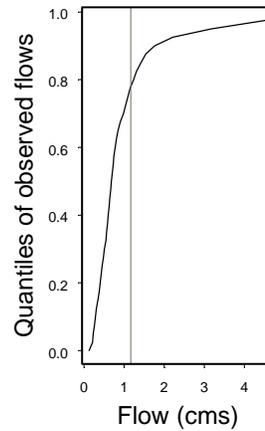
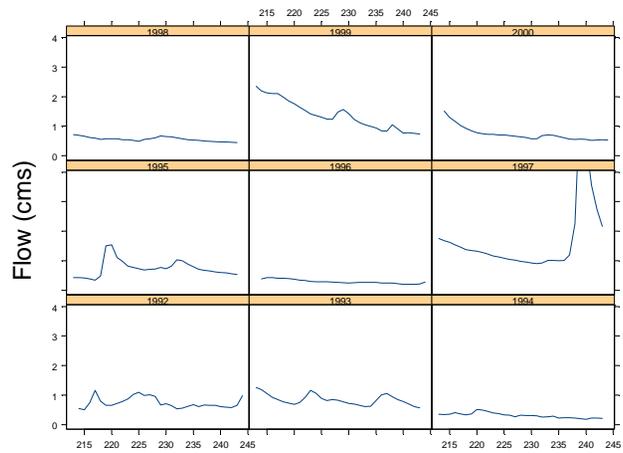
Station Name: Skagit near Hope
 Station ID: 08PA001
 Period of record: 1915-1955
 low flow month = Sep



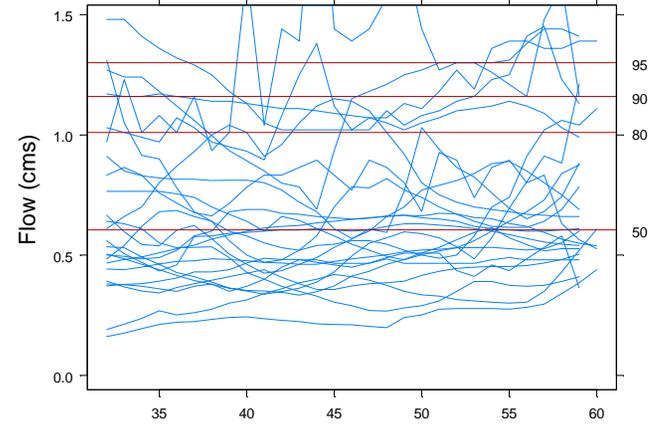
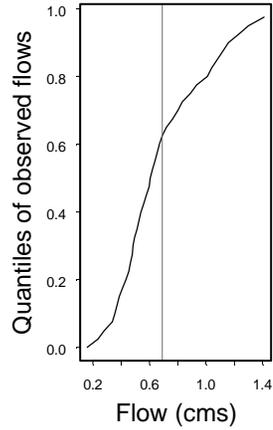
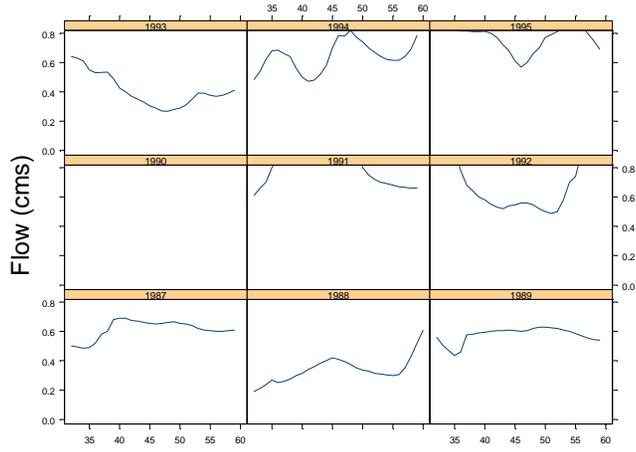
Station Name: Bings Creek near mouth
 Station ID: 08HA016
 Period of record: 1961-2000
 low flow month = Sep



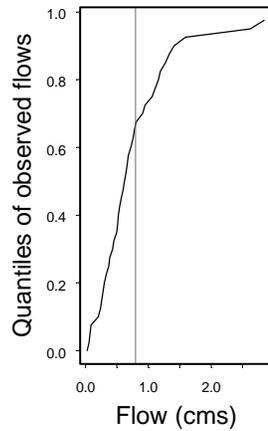
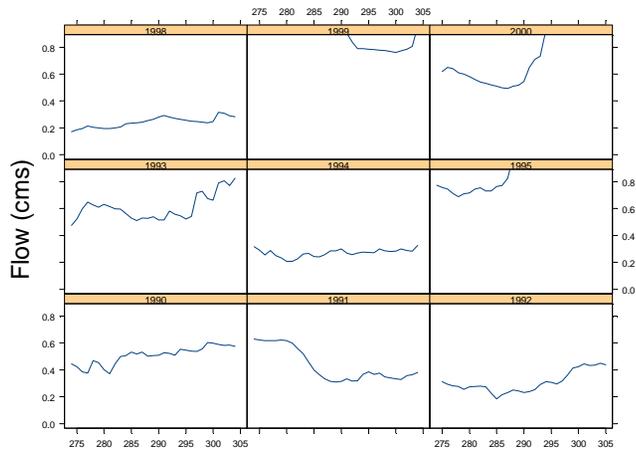
Station Name: Chemainus near Westholme
 Station ID: 08HA001
 Period of record: 1914-2000
 low flow month = Aug



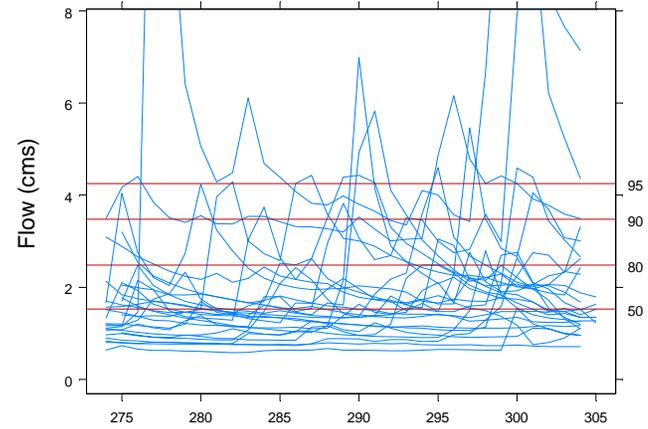
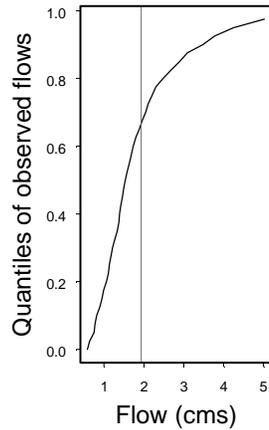
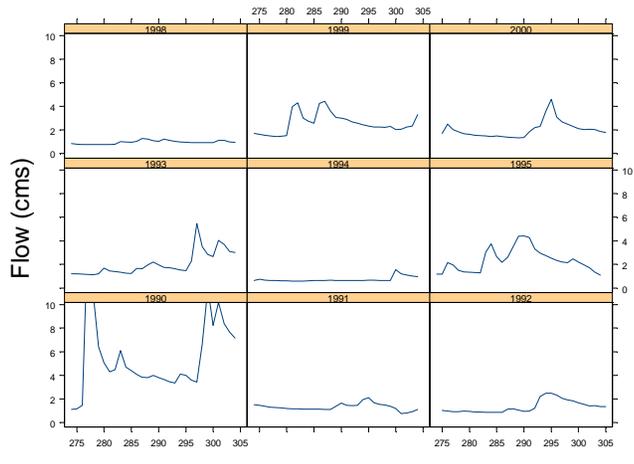
Station Name: Louis Creek at mouth
 Station ID: 08LB072
 Period of record: 1971-1996
 low flow month = Feb



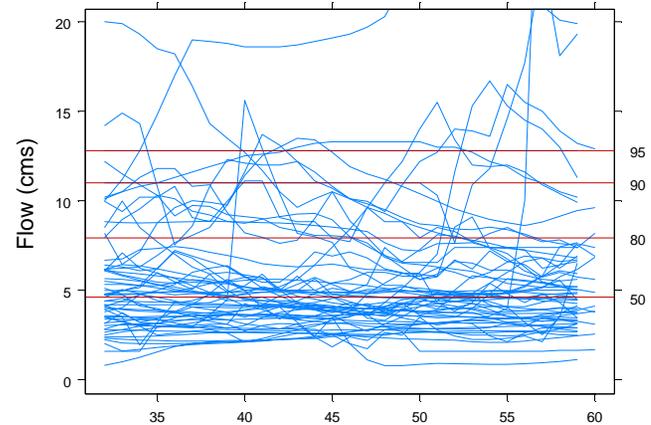
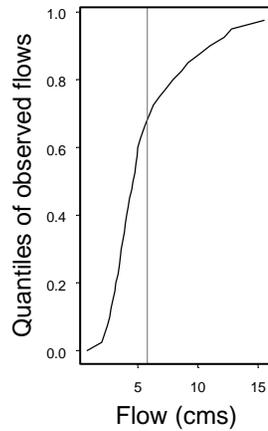
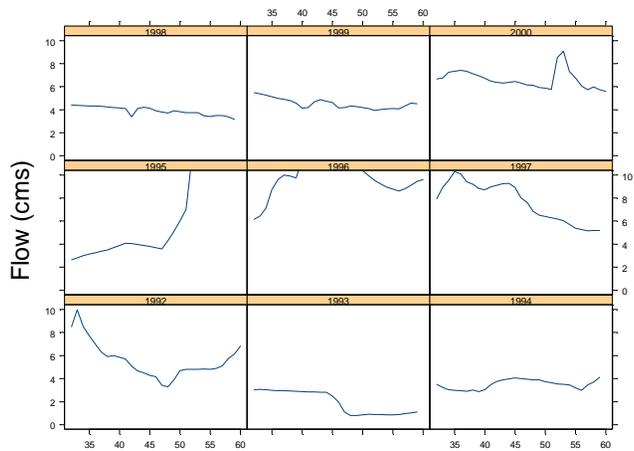
Station Name: Lemieux Creek at mouth
 Station ID: 08LB078
 Period of record: 1977-2000
 low flow month = Oct



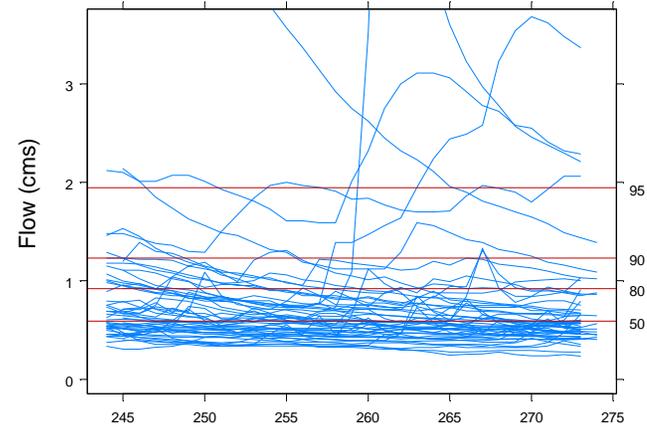
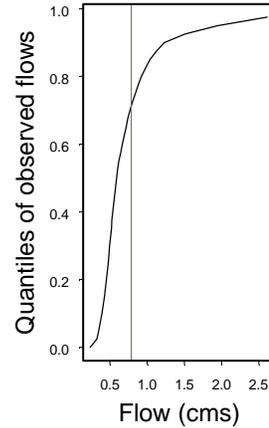
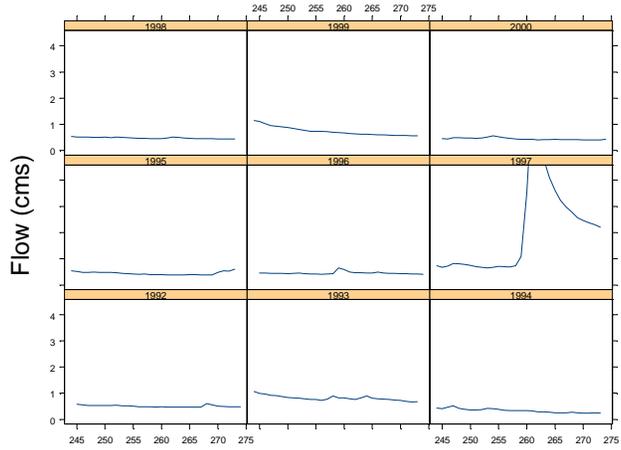
Station Name: Similkameen above Goodfellow Creek
 Station ID: 08NL070
 Period of record: 1974-2000
 low flow month = Oct



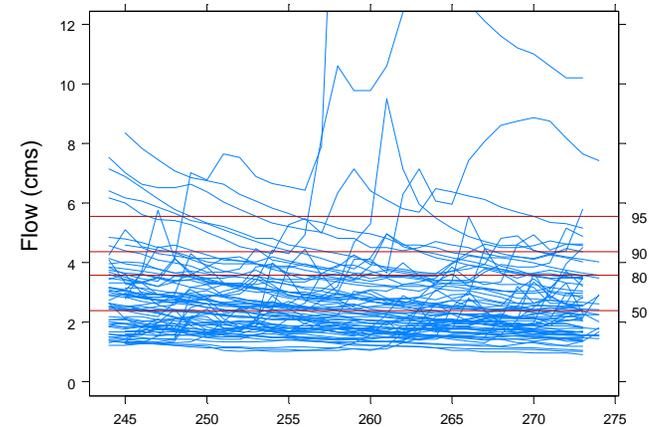
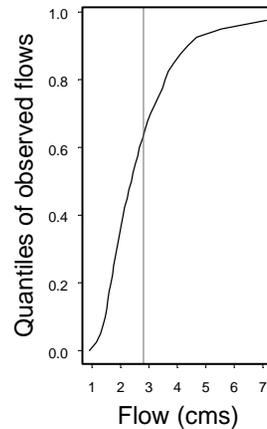
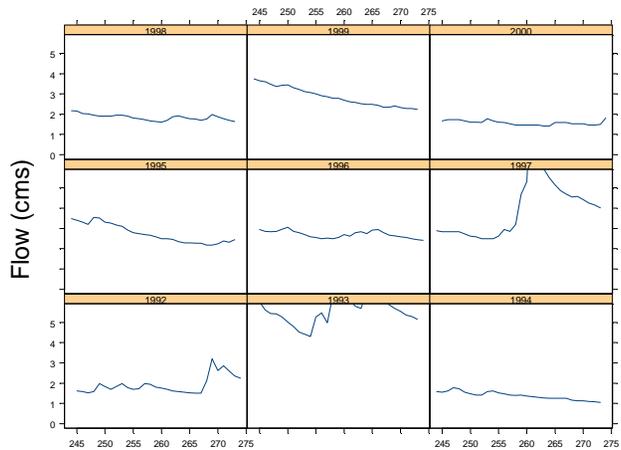
Station Name: Similkameen near Princeton
 Station ID: 08NL007
 Period of record: 1914-2000
 low flow month = Feb



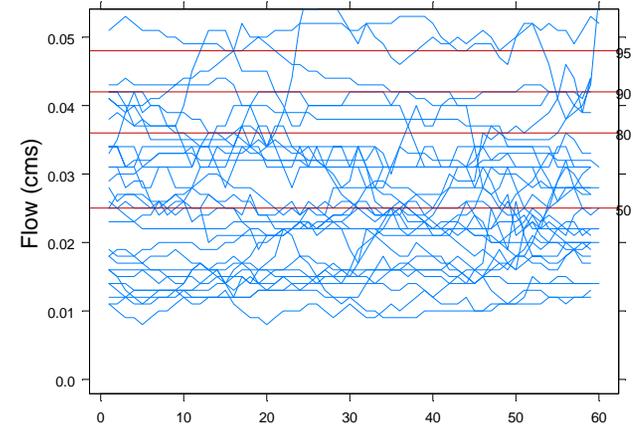
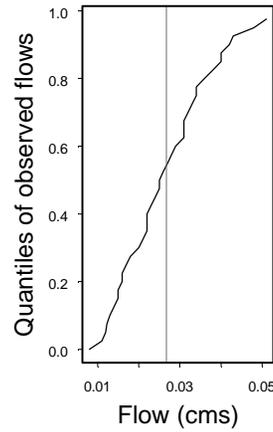
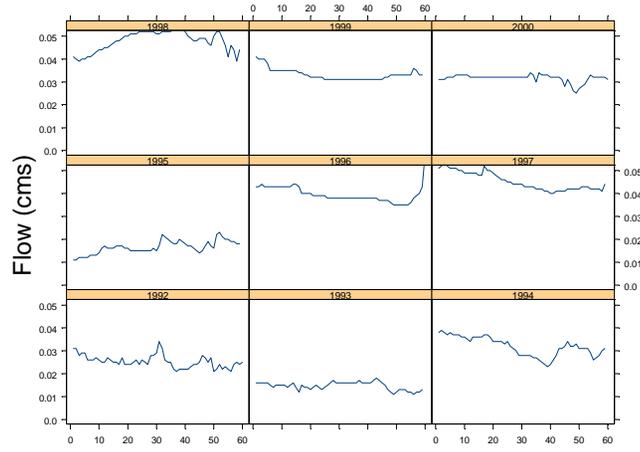
Station Name: Big Sheep Creek near Rossland
 Station ID: 08NE039
 Period of record: 1929-2000
 low flow month = Sep



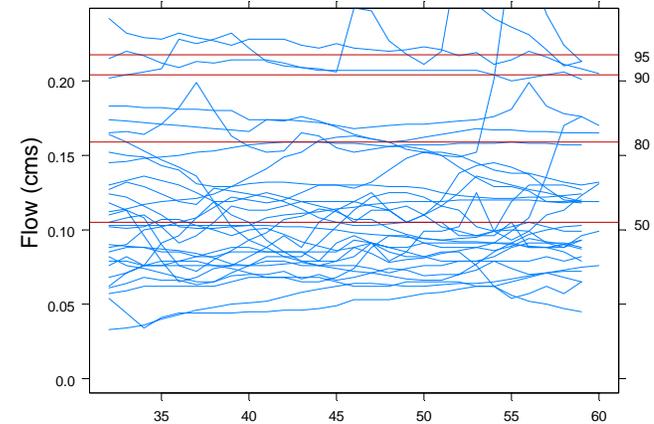
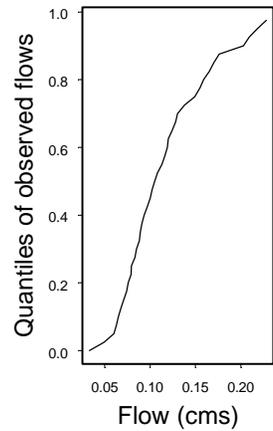
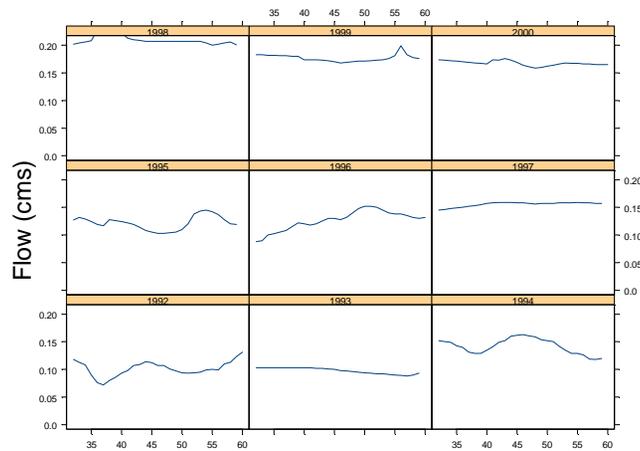
Station Name: Moyie River at Eastport
 Station ID: 08NH006
 Period of record: 1915-2000
 low flow month = Sep



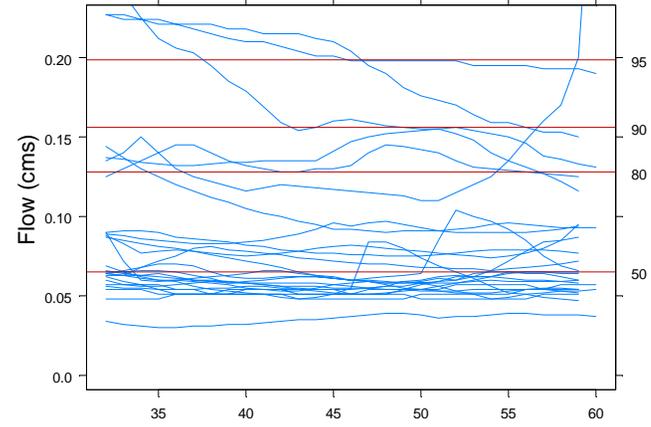
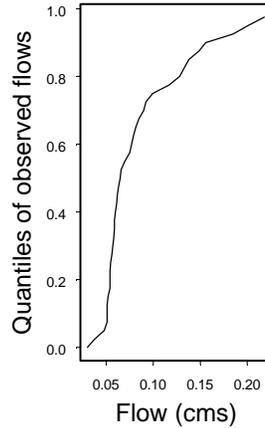
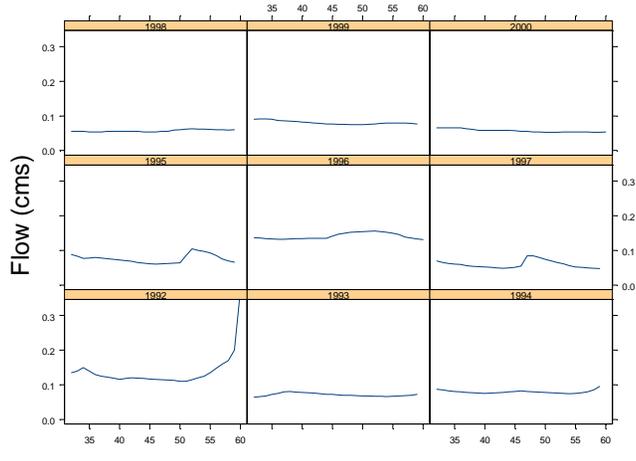
Station Name: Greata Creek near mouth
 Station ID: 08NM173
 Period of record: 1970-2000
 low flow month = Jan + Feb



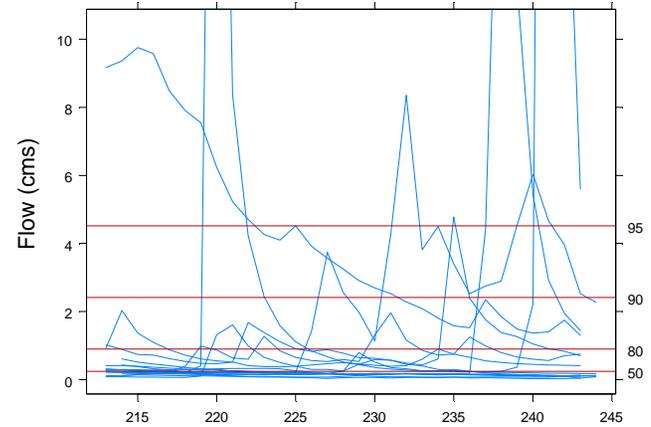
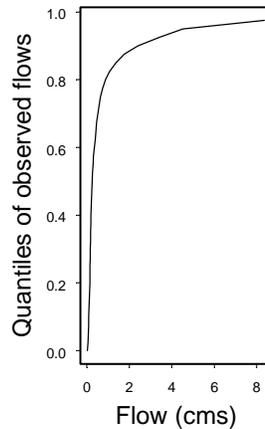
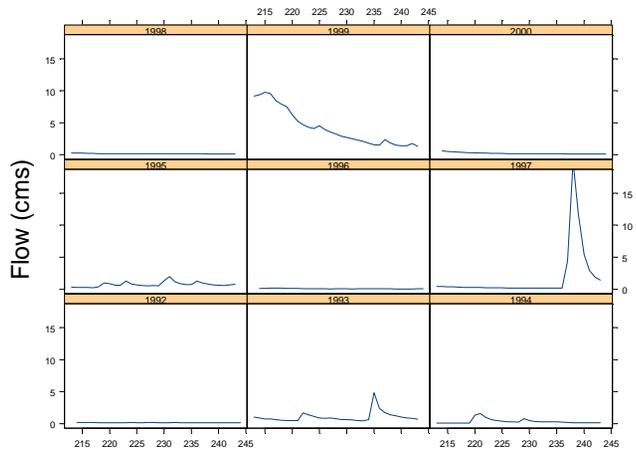
Station Name: Vaseux Creek above Solco Creek
 Station ID: 08NM171
 Period of record: 1970-2000
 low flow month = Feb



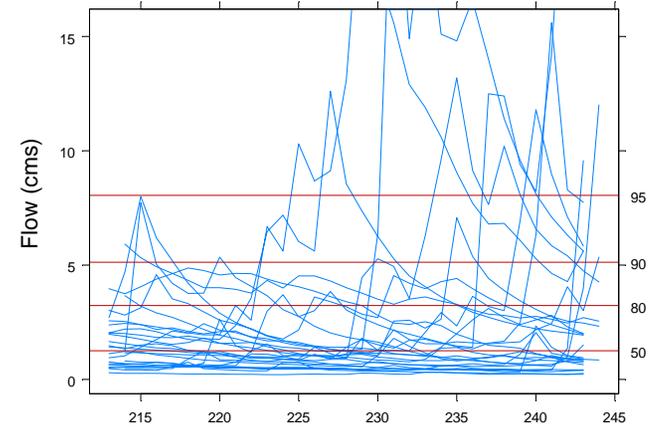
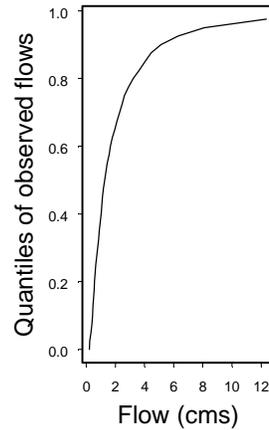
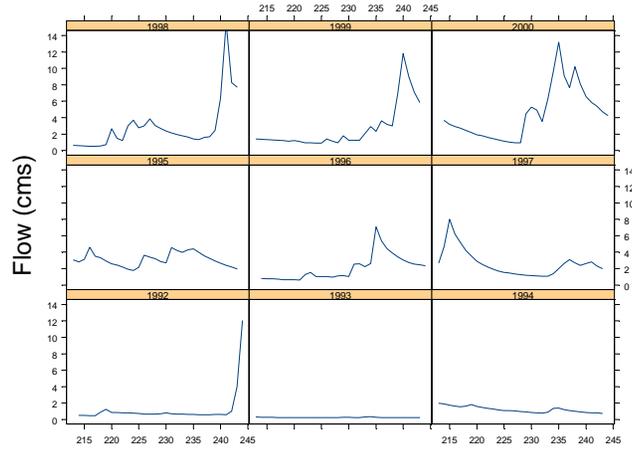
Station Name: Lingfield Creek at mouth
 Station ID: 08MA006
 Period of record: 1974-2000
 low flow month = Feb



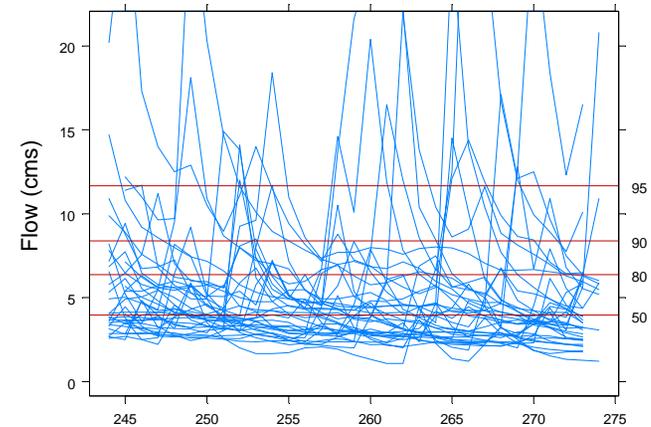
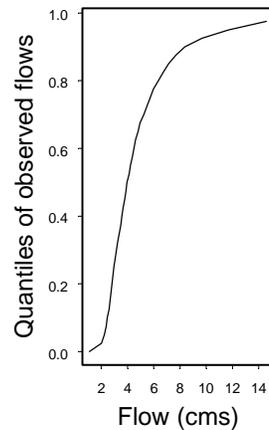
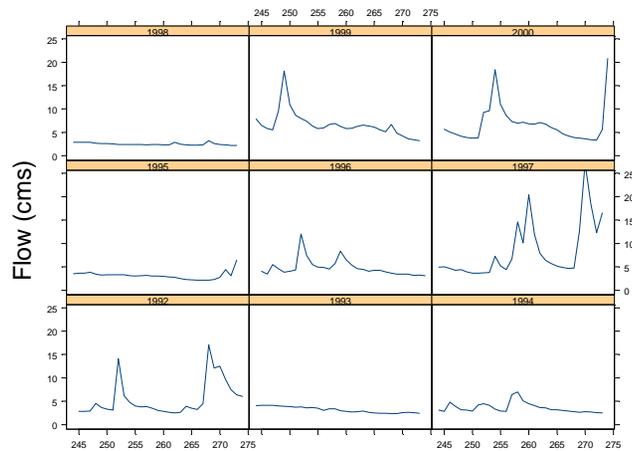
Station Name: Browns River near Courtenay
 Station ID: 08HB025
 Period of record: 1960-2000
 low flow month = Aug



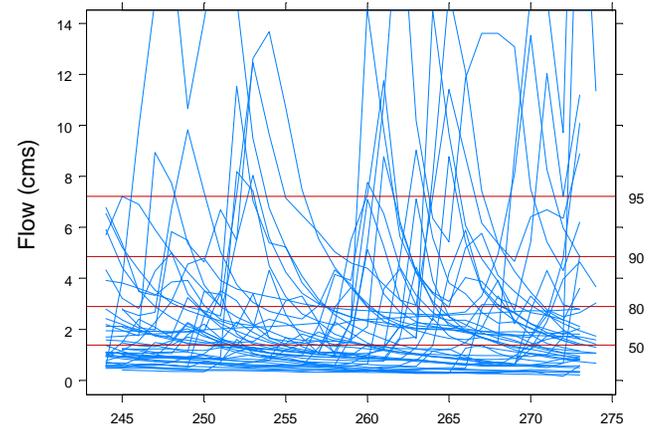
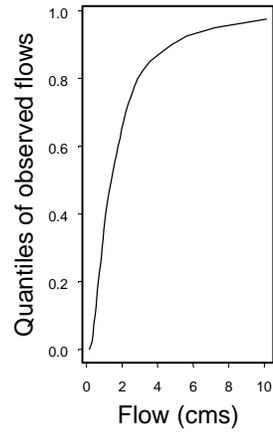
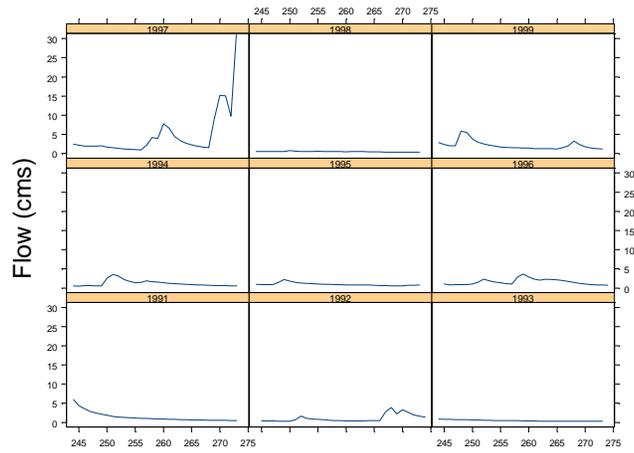
Station Name: Pallant Creek near Queen Charlotte
 Station ID: 08OB002
 Period of record: 1962-2000
 low flow month = Aug

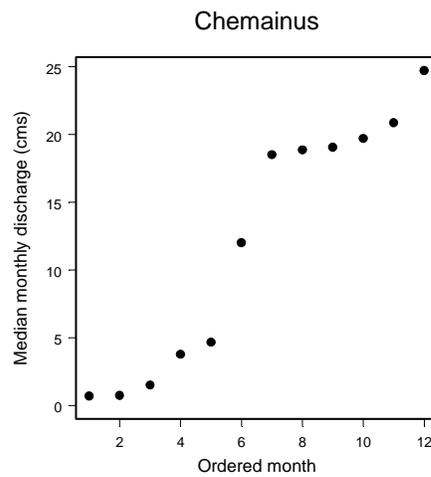
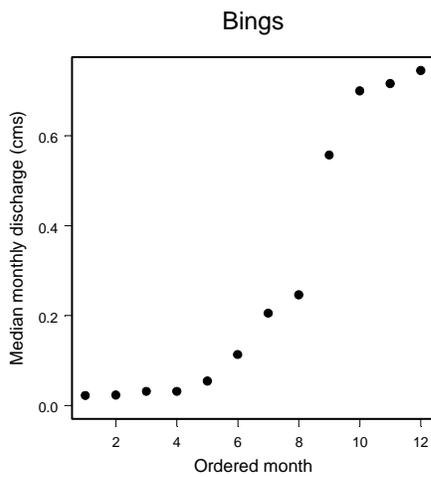
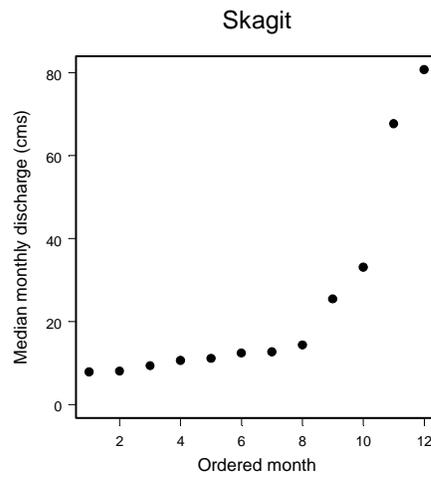
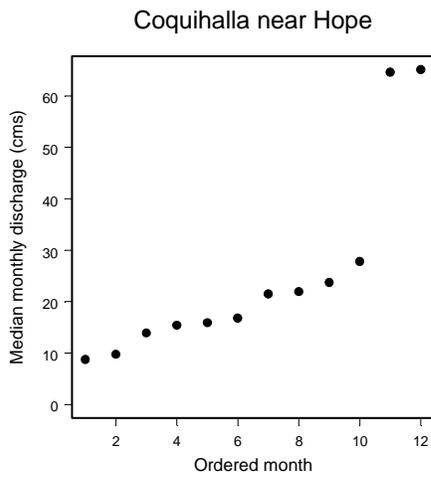
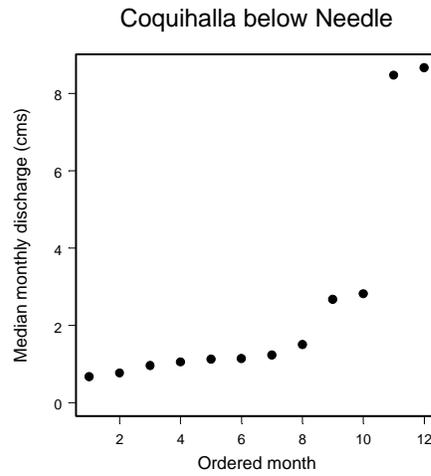
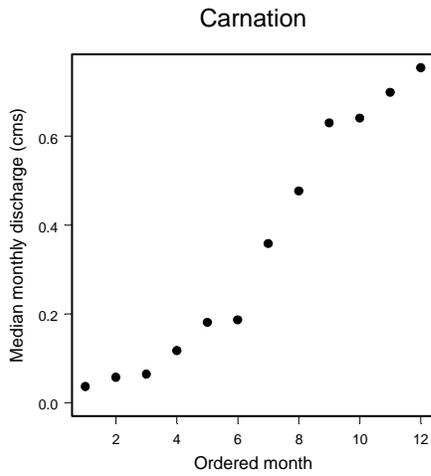


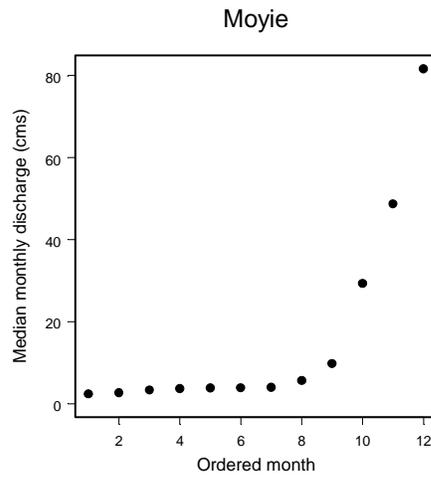
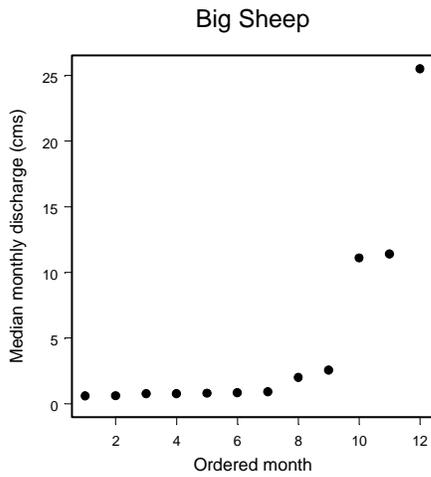
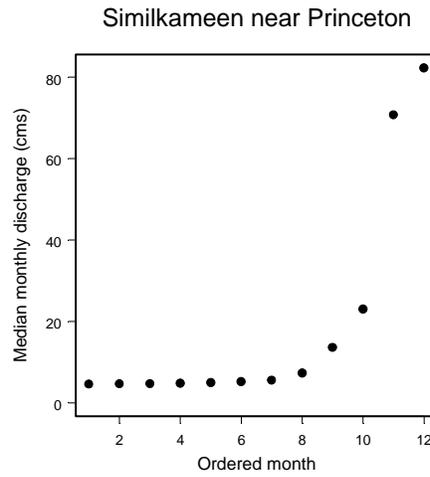
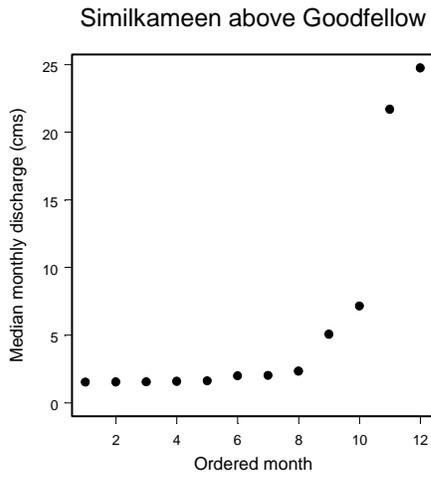
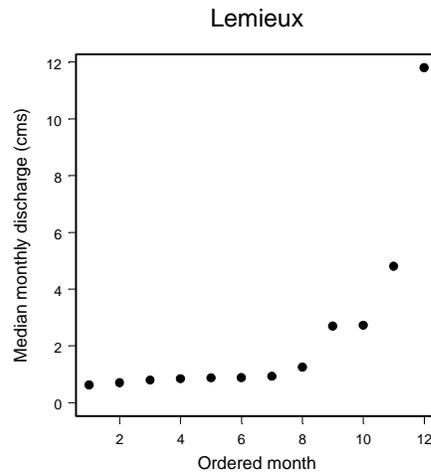
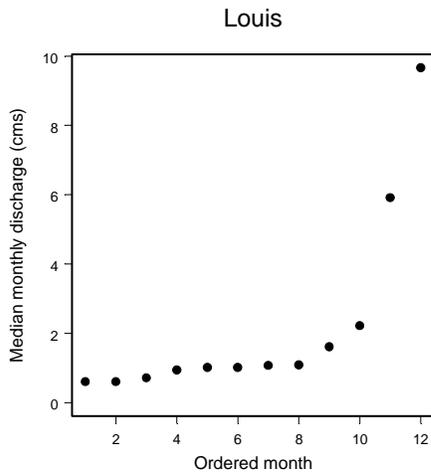
Station Name: Slease Creek near Vedder Crossing
 Station ID: 08MH056
 Period of record: 1957-2000
 low flow month = Sep

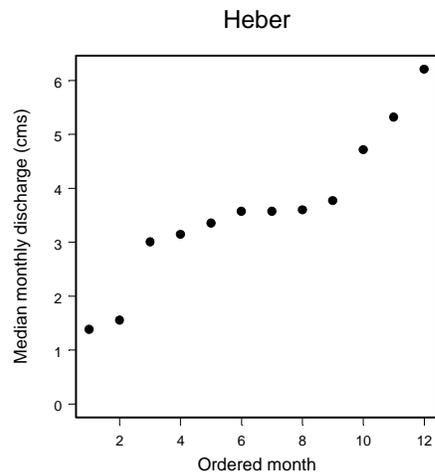
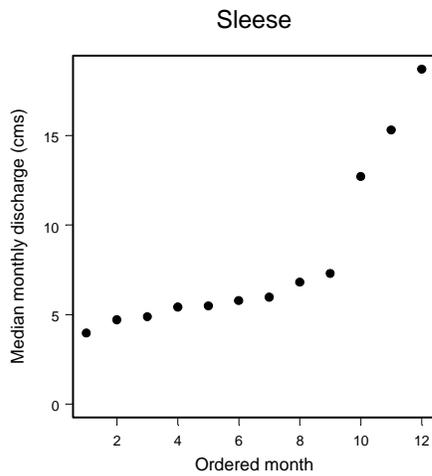
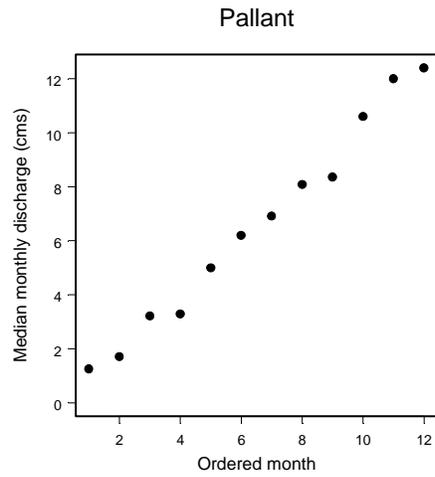
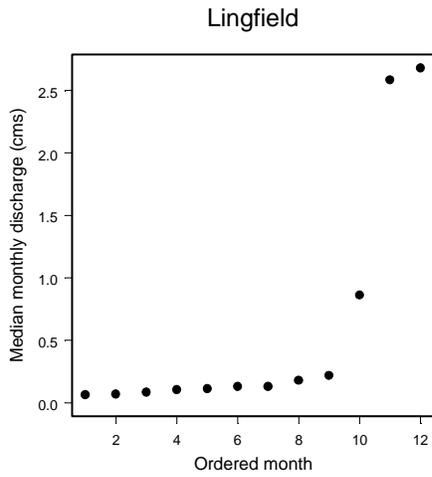
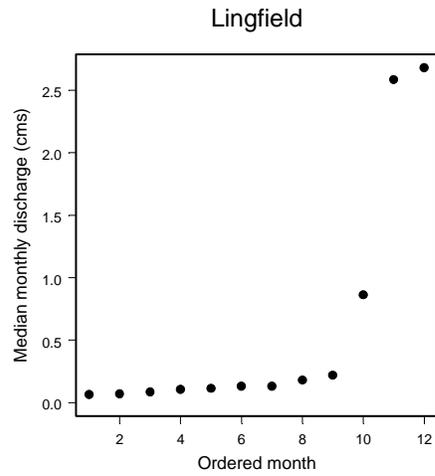
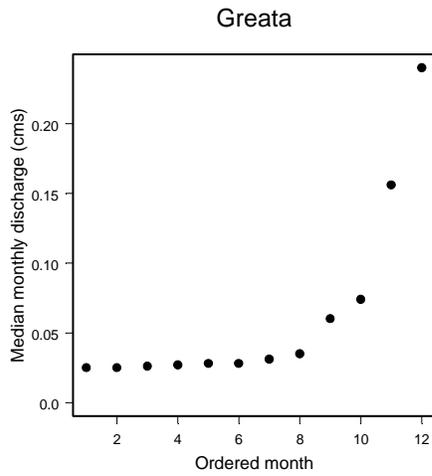


Station Name: Heber River, Vancouver Island (immediately u/s of diversion)
Station ID: BC Hydro inflow file
Period of record: 1959 – 1999
low flow month = Sep









APPENDIX C.
PRE- AND POST-PROJECT FLOWS BASED ON
FLOW THRESHOLDS FOR FISH-BEARING STREAMS

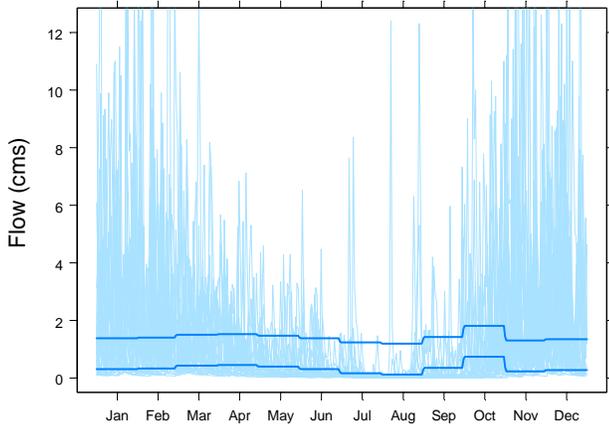
Nineteen sites on BC streams were selected for investigating the appropriateness of different standard-setting approaches (Table A1). This appendix presents a series of figures to indicate what the proposed flow rules look like relative to natural flows, and the simulated performance of those rules on the selected streams.

The first set of figures present natural flow records for each of the test streams. The light blue represents mean daily flows, with flow time series superimposed for each year on record. The dark blue lines show the minimum and maximum diversion amounts for the proposed rule. The calculation of the rule is explained in the main body of the report and in Appendix B.

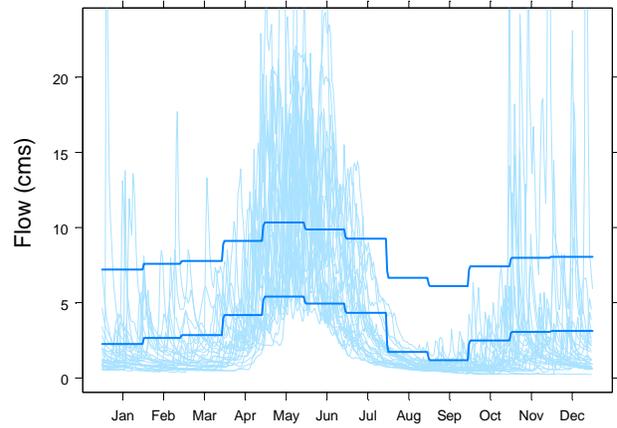
The second set of figures shows simulated pre- and post-project flows using the proposed fish-bearing diversion rule for each of the test streams. Three of the graphs are multipanel plots where each panel represents a year from the period of record over a total of nine years. The y-axis is limited to 50% of the maximum flow on record to enhance resolution for low flow periods. These plots allow one to visualize variation in timing, magnitude, and duration of flows from one year to another. The plot in the upper left shows natural mean daily flows. The plot in the upper right shows regulated flows in the diversion section. Plots in the lower left show simulated diversion flows. In each plot the blue line represents MAD.

Plots in the lower right present the quantiles for mean daily natural flows (black line) and mean daily regulated flows (red line) for the period of record. The point at which the two lines diverge represents the frequency break point for diversion. The break point is the frequency at which diversion does not occur under this diversion rule. For example, on the Heber River diversion does not occur approximately 55% of the time.

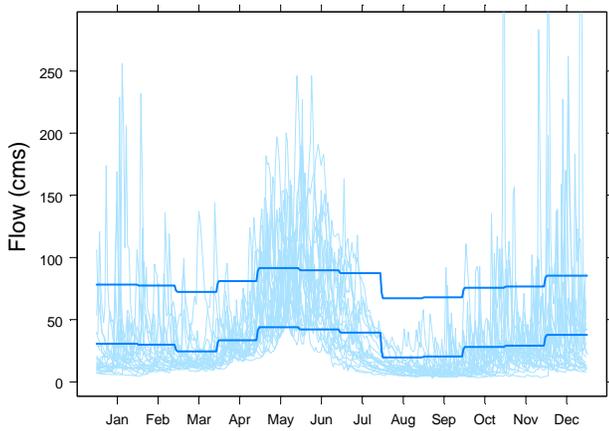
Carnation



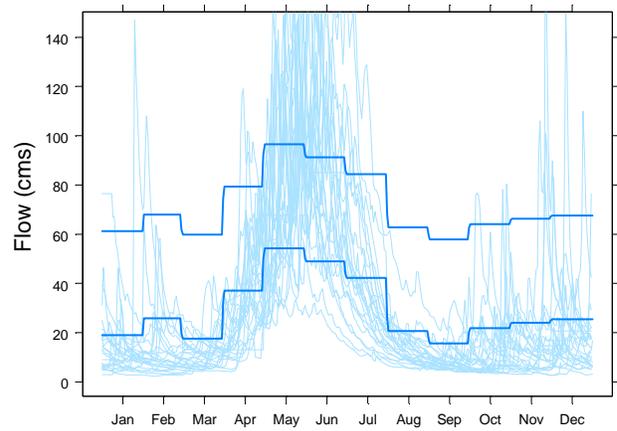
Coquihalla below Needle Creek



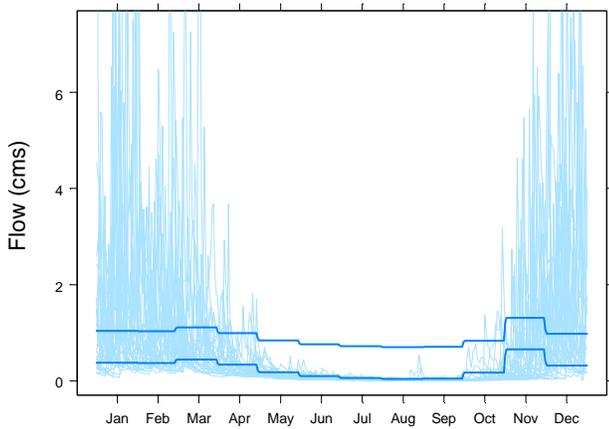
Coquihalla near Hope



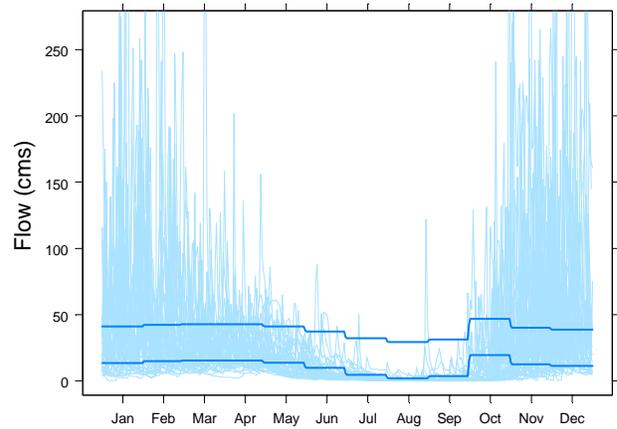
Skagit



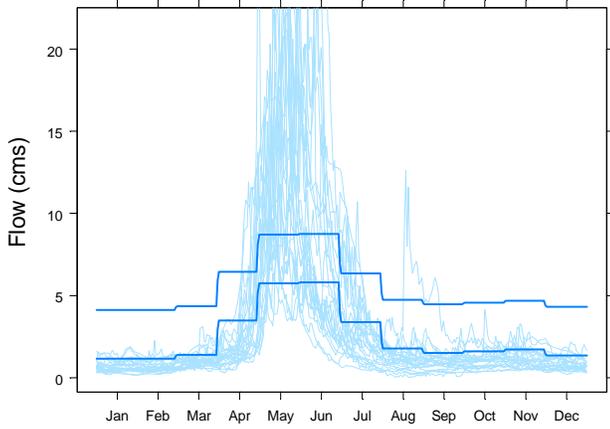
Bings



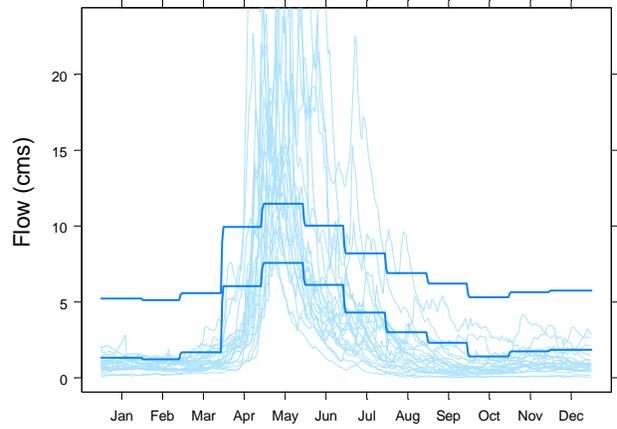
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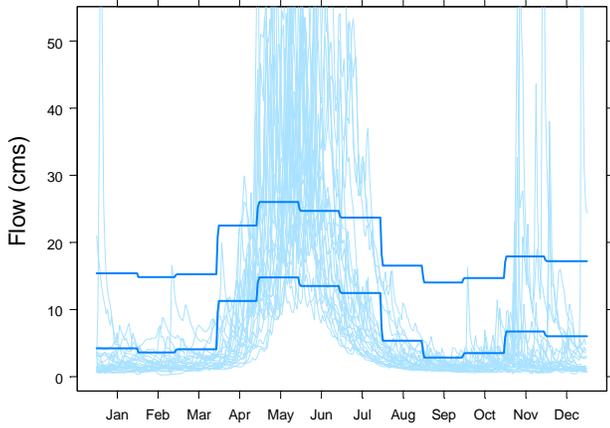
Louis



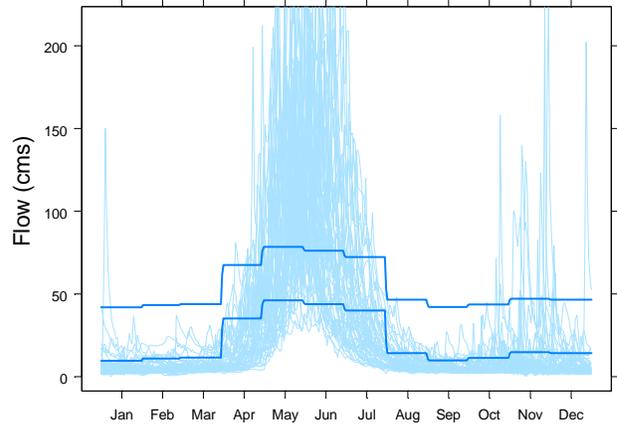
Lemieux



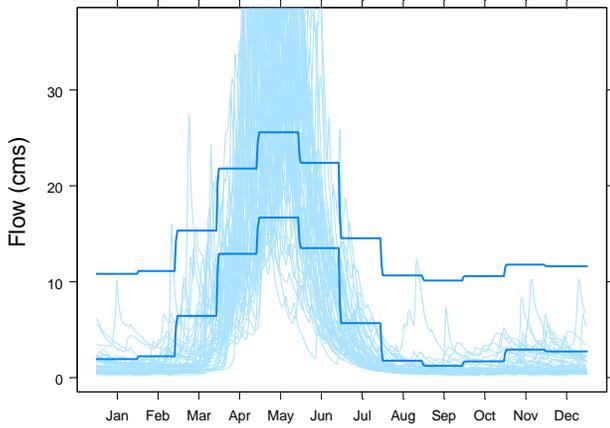
Similkameen above Goodfellow Creek



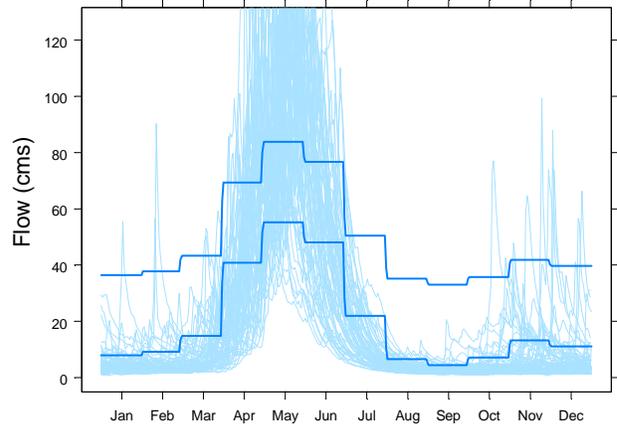
Similkameen near Princeton



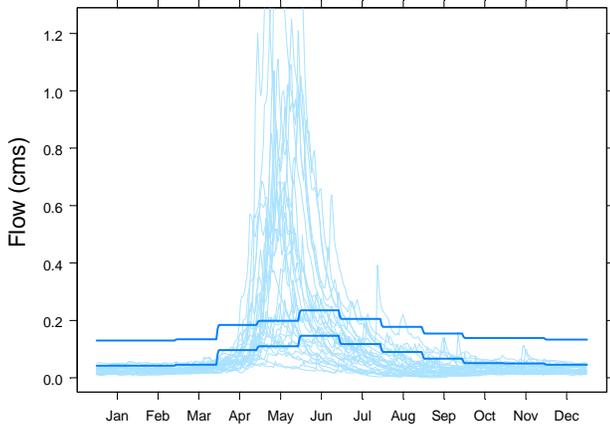
Big Sheep



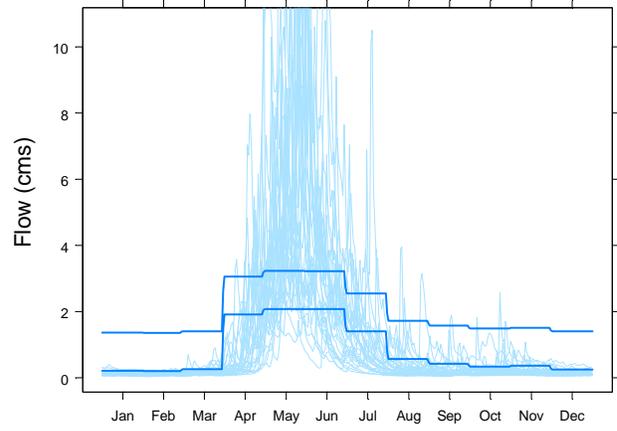
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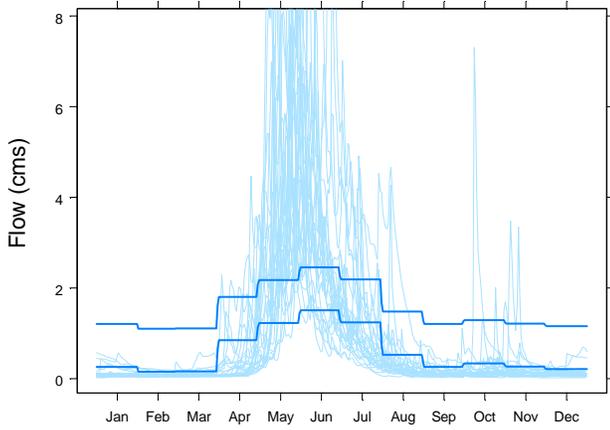
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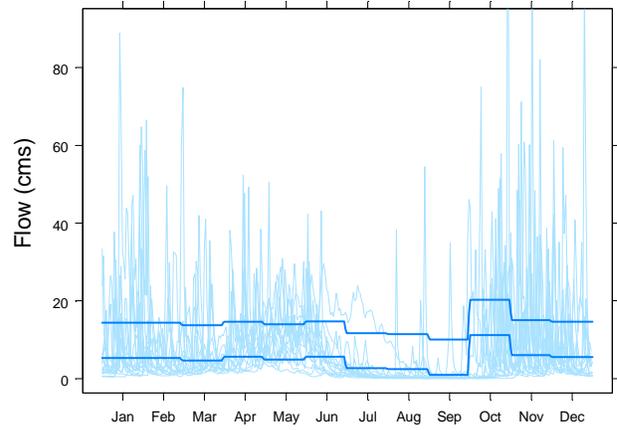
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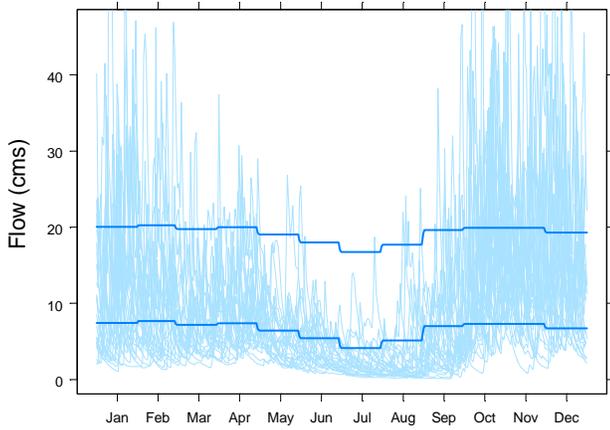
Lingfield



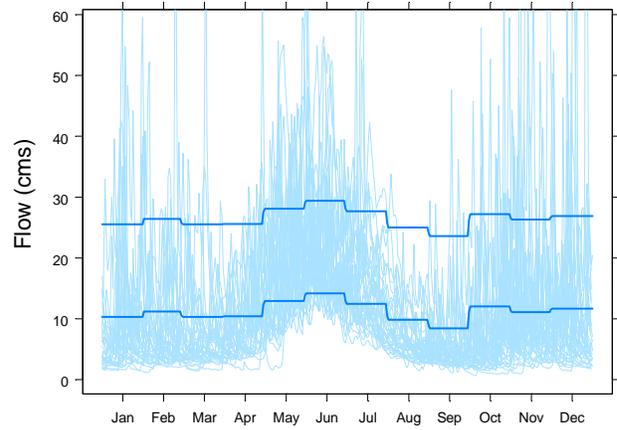
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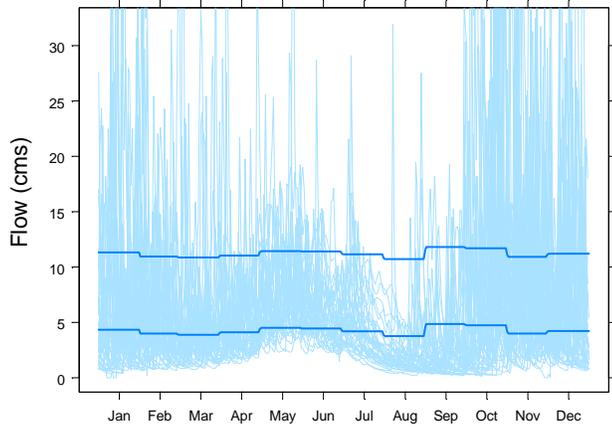
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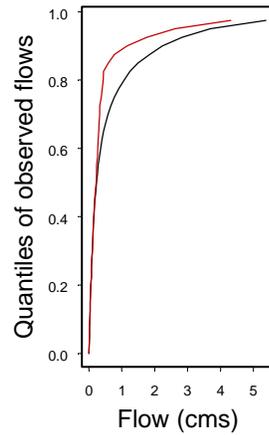
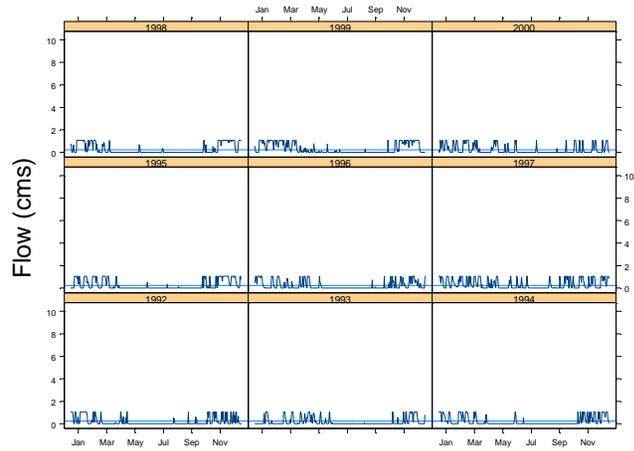
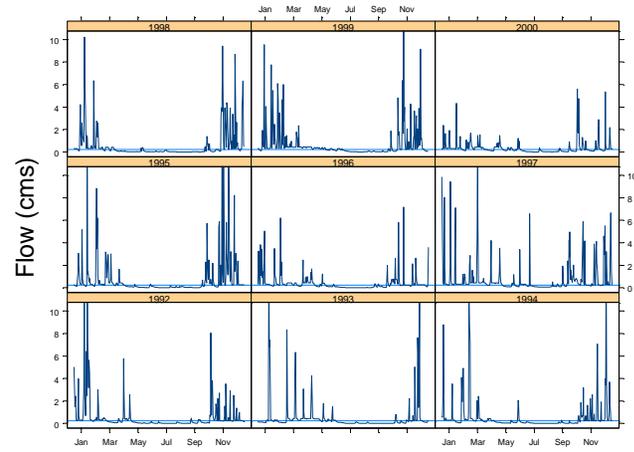
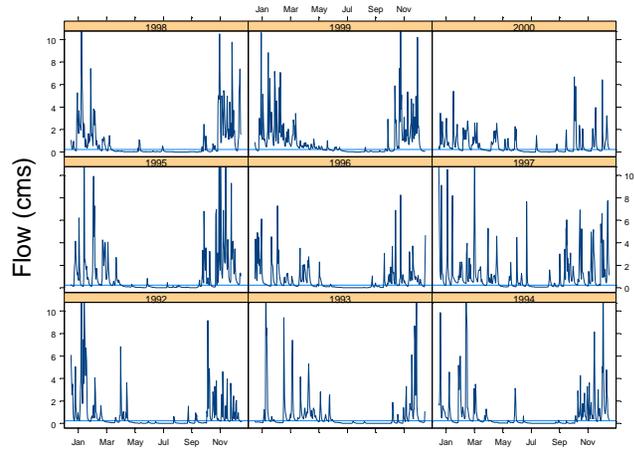
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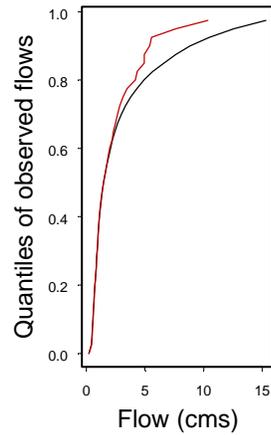
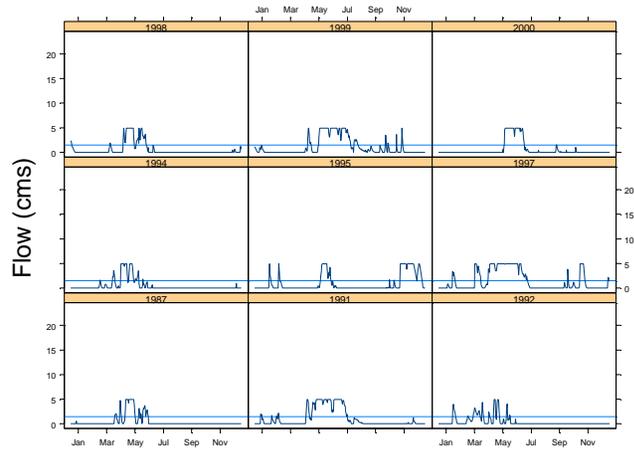
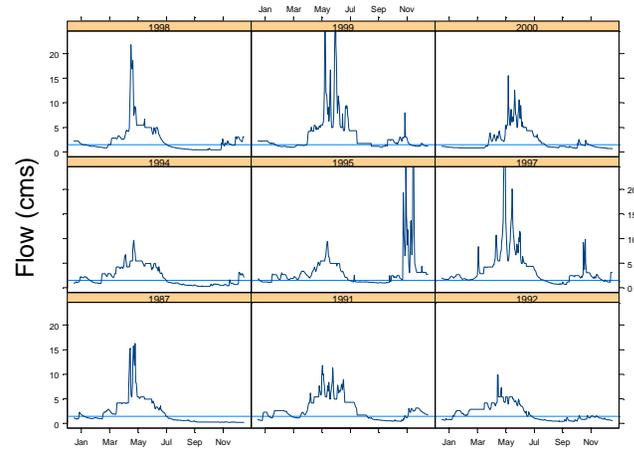
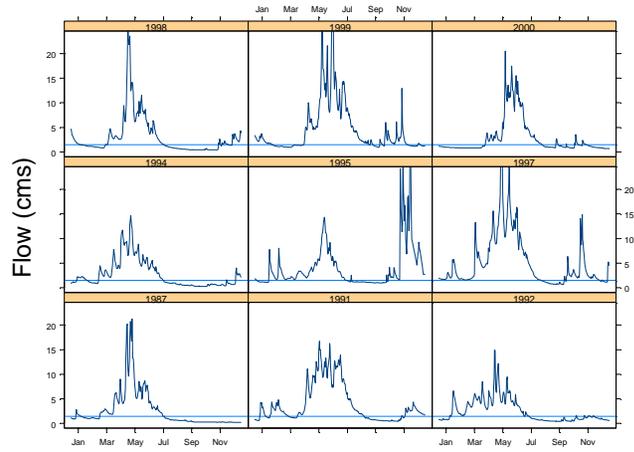
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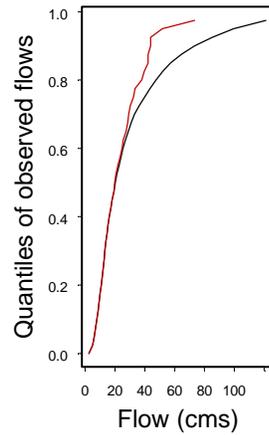
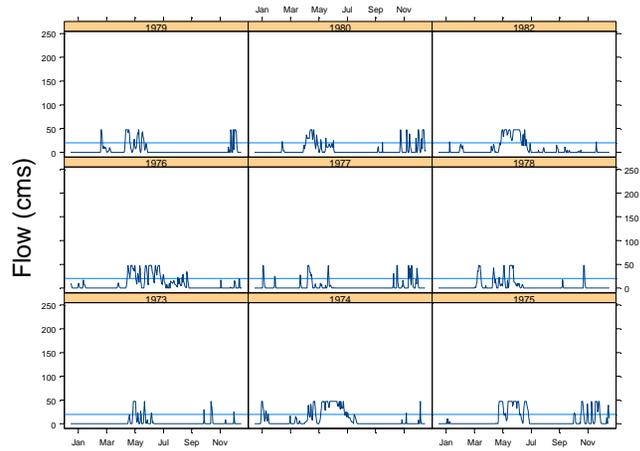
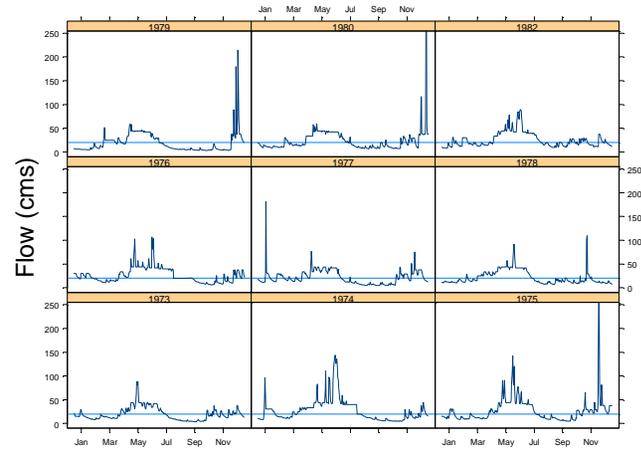
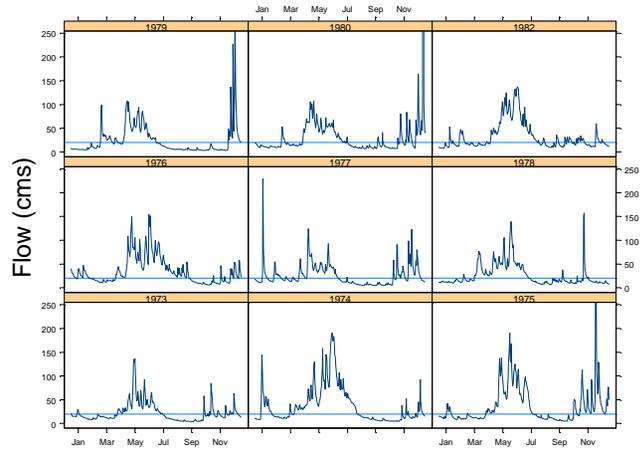
Station Name: Carnation Creek at the mouth
Station ID: 08HB048
Period of record: 1973-2000



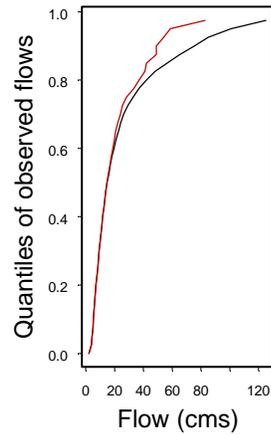
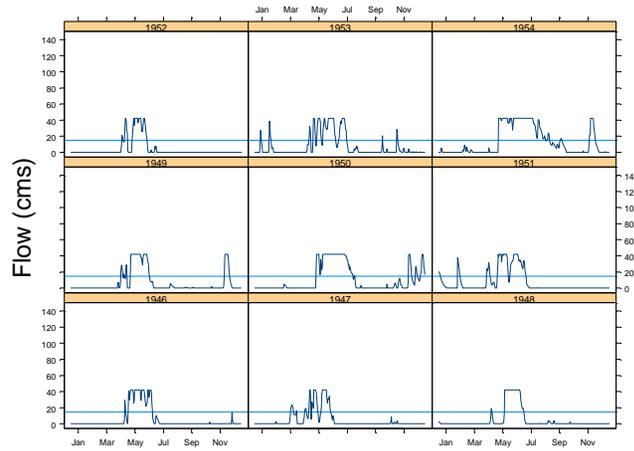
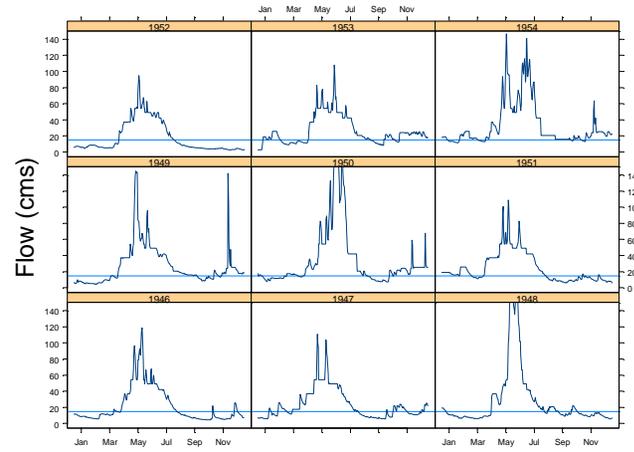
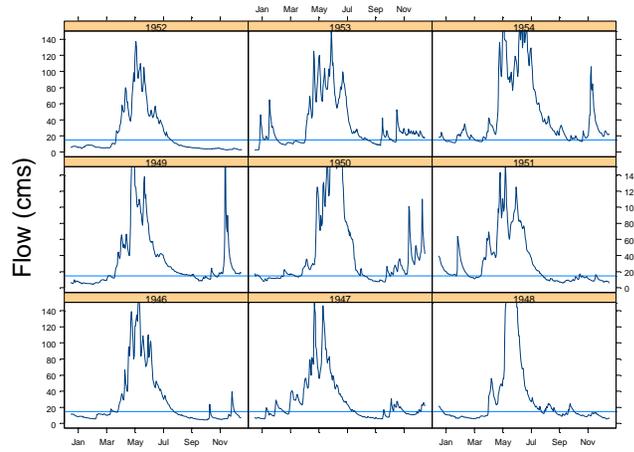
Station Name: Coquihalla below Needle Creek
Station ID: 08MF062
Period of record: 1965-2000



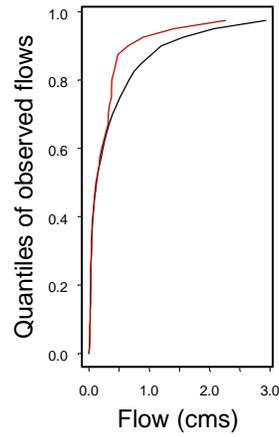
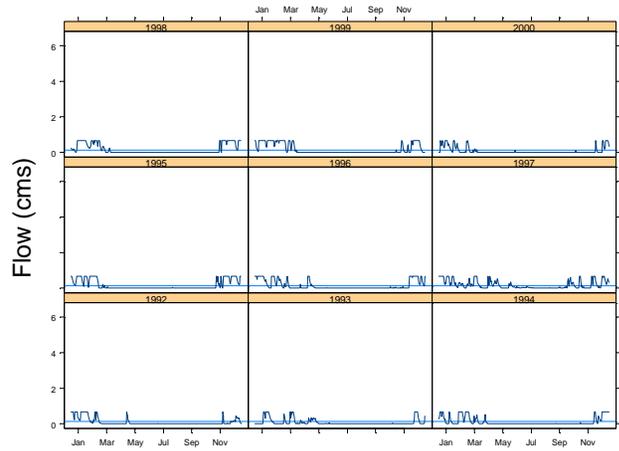
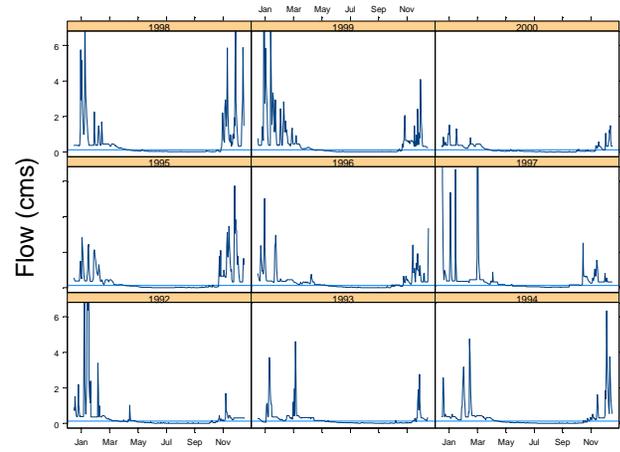
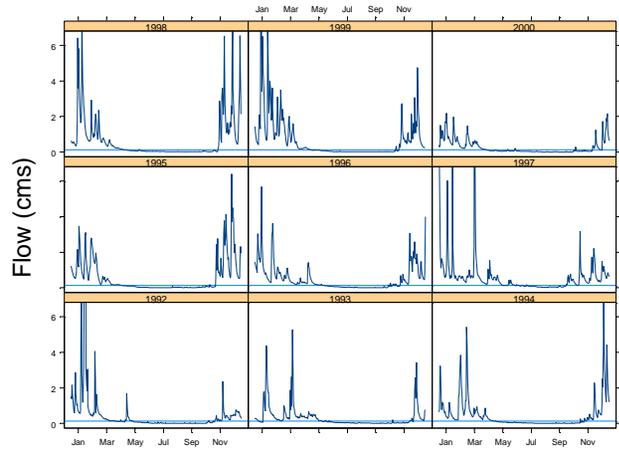
Station Name: Coquihalla near Hope
Station ID: 08MF003
Period of record: 1911-1983



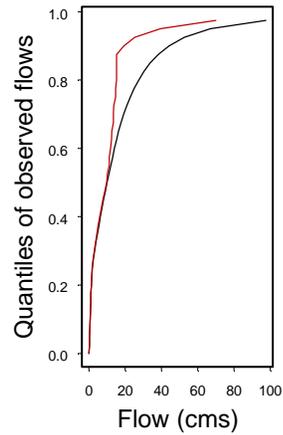
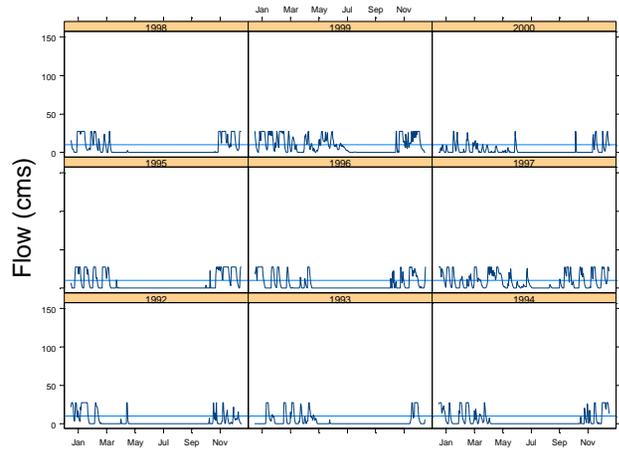
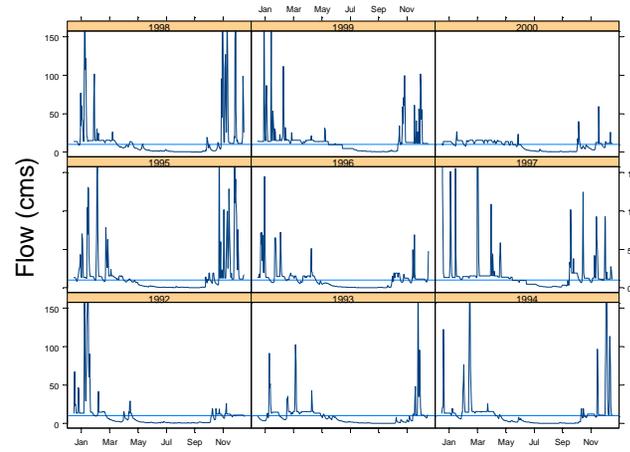
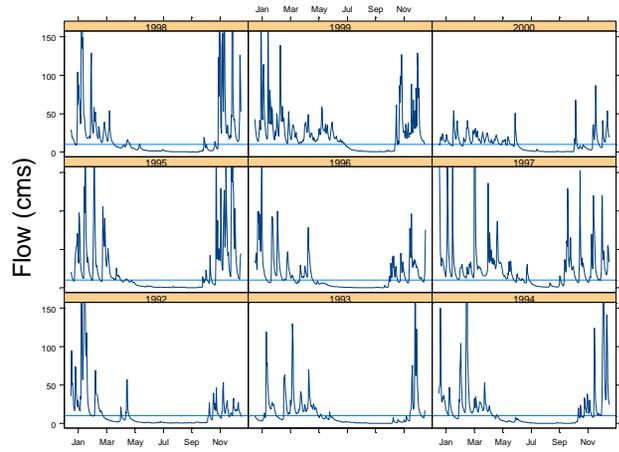
Station Name: Skagit near Hope
Station ID: 08PA001
Period of record: 1915-1955



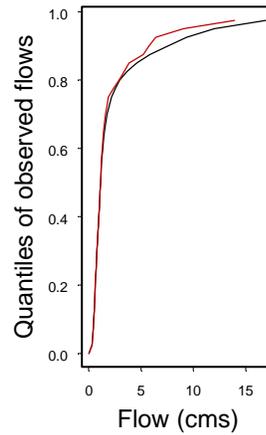
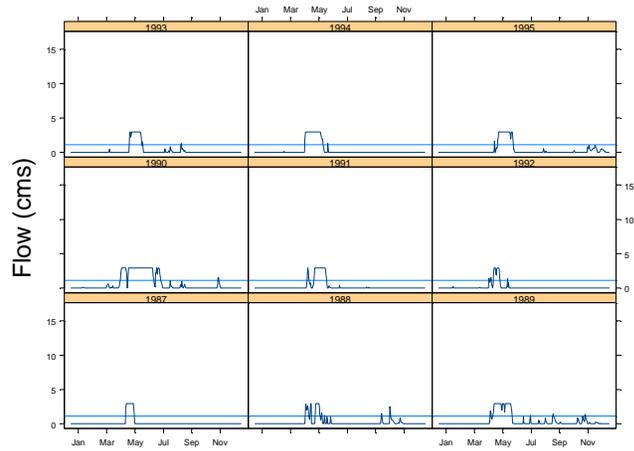
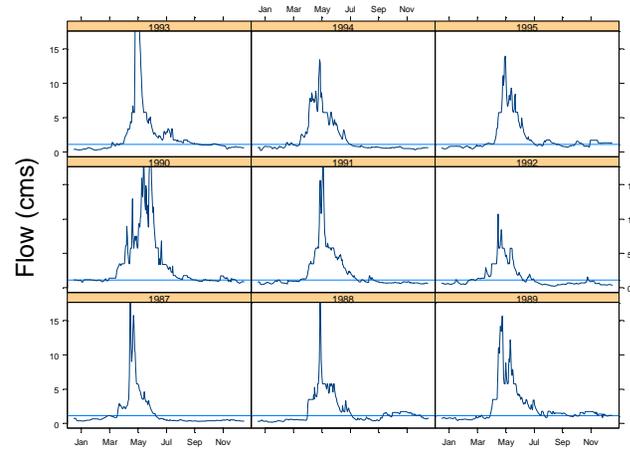
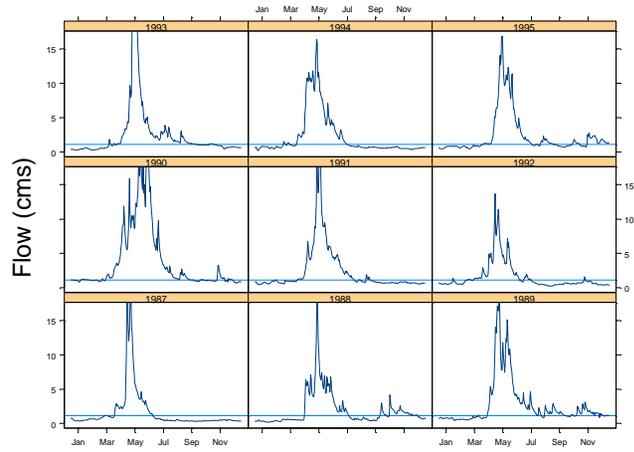
Station Name: Bings Creek near mouth
Station ID: 08HA016
Period of record: 1961-2000



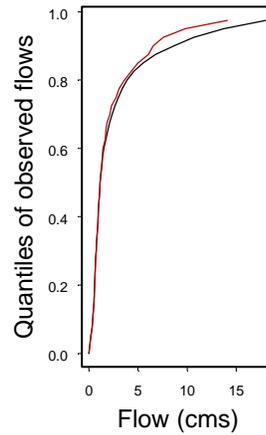
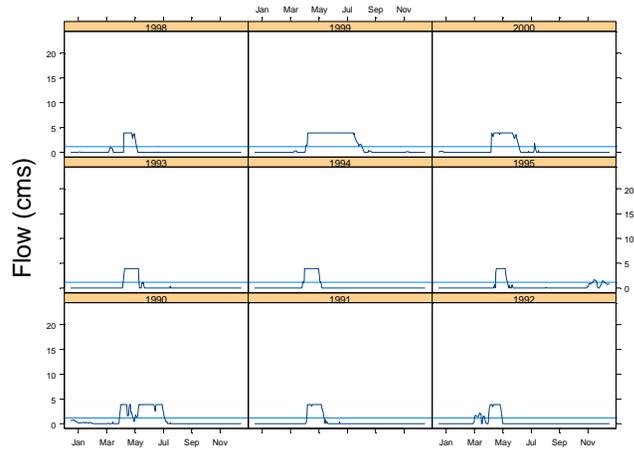
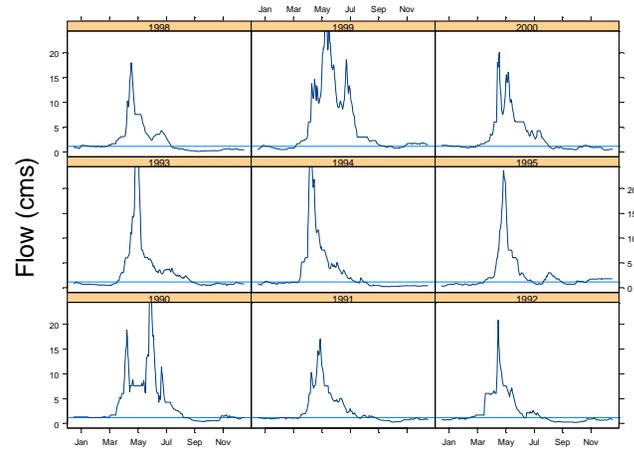
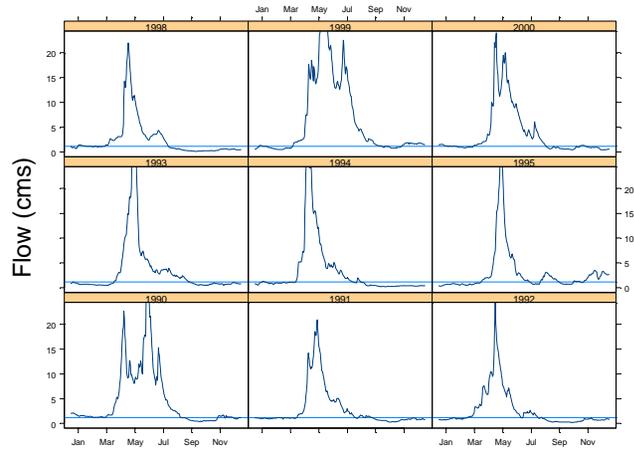
Station Name: Chemainus near Westholme
Station ID: 08HA001
Period of record: 1914-2000



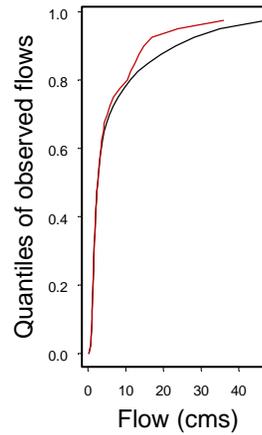
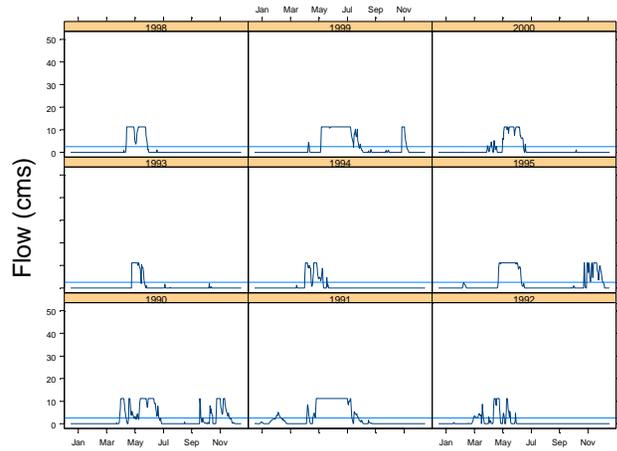
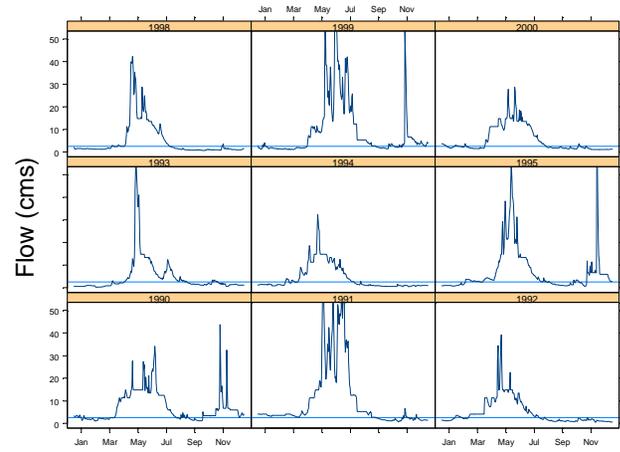
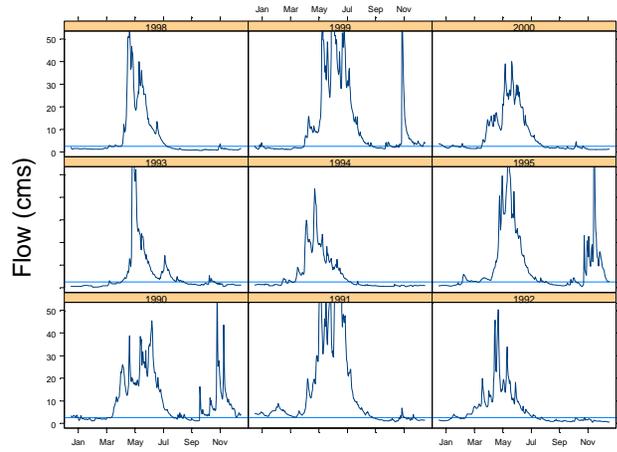
Station Name: Louis Creek at mouth
Station ID: 08LB072
Period of record: 1971-1996



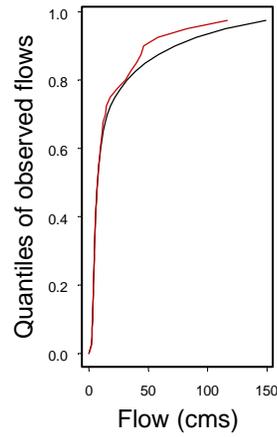
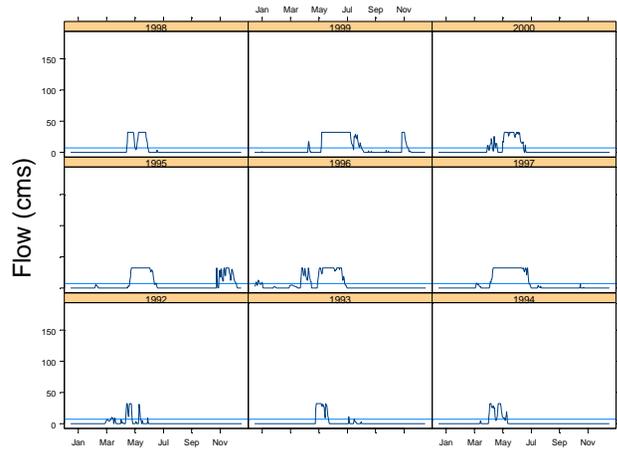
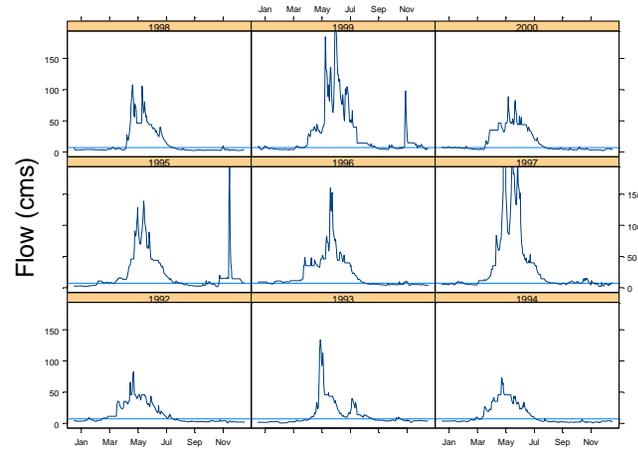
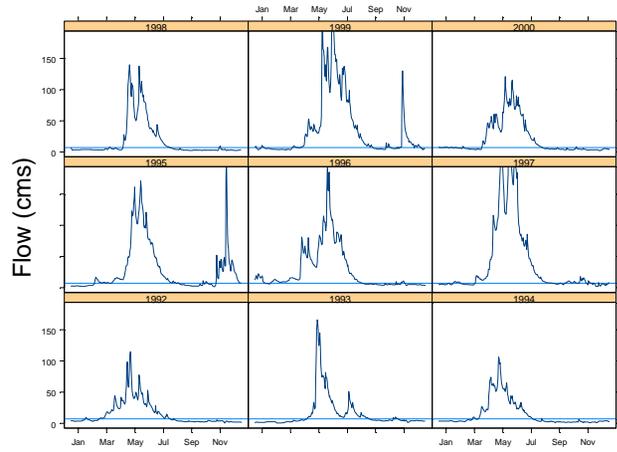
Station Name: Lemieux Creek at mouth
Station ID: 08LB078
Period of record: 1977-2000



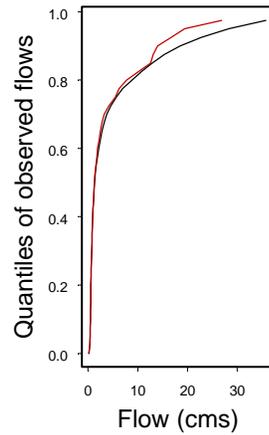
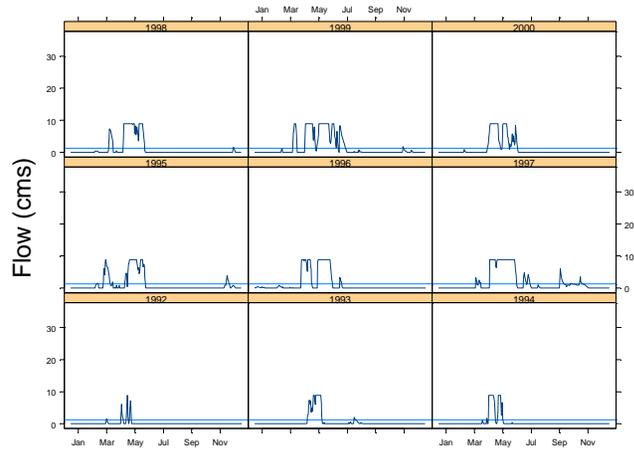
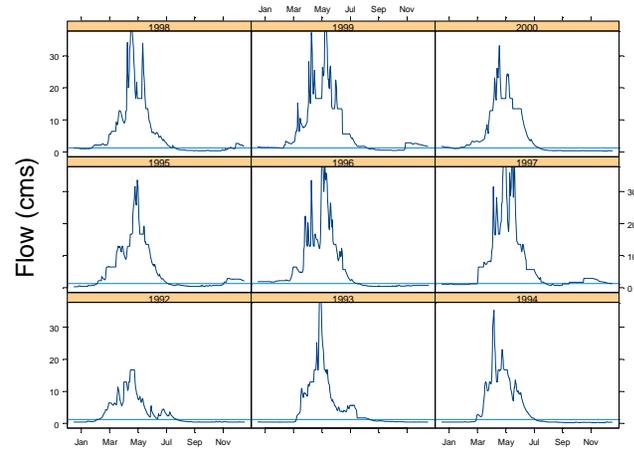
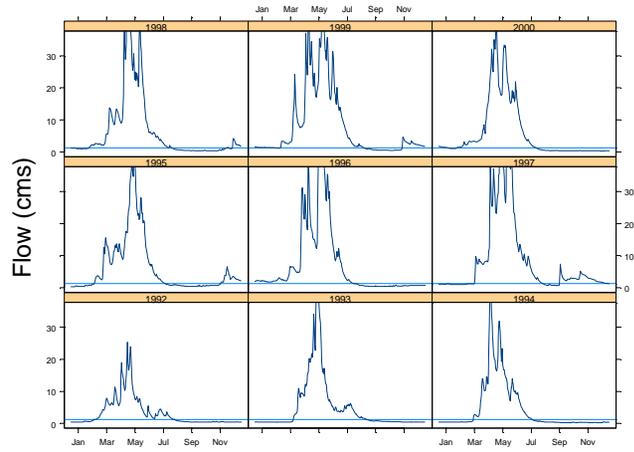
Station Name: Similkameen above Goodfellow Creek
Station ID: 08NL070
Period of record: 1974-2000



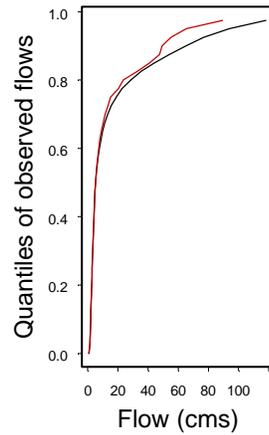
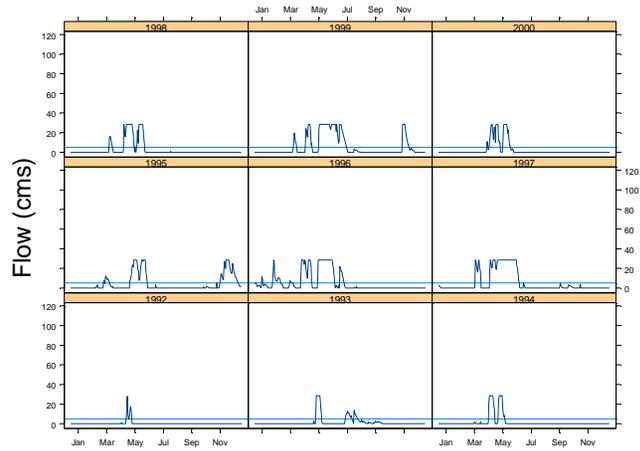
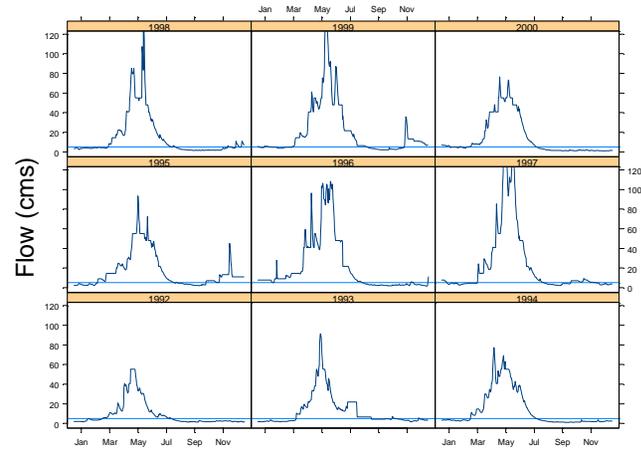
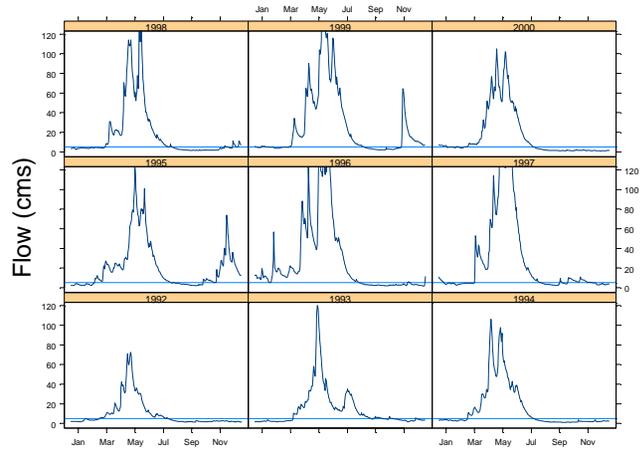
Station Name: Similkameen near Princeton
Station ID: 08NL007
Period of record: 1914-2000



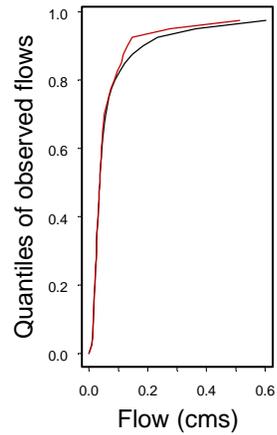
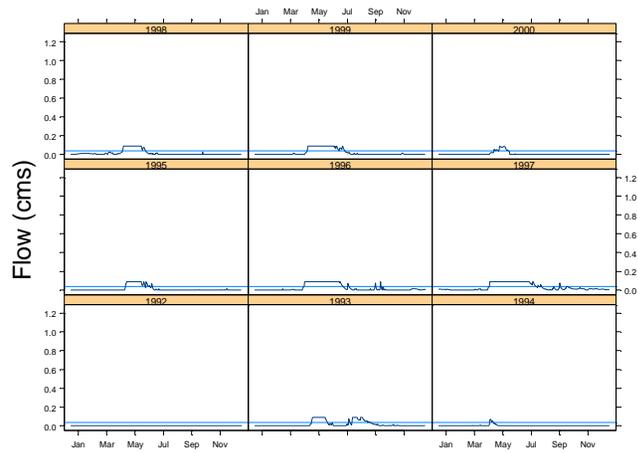
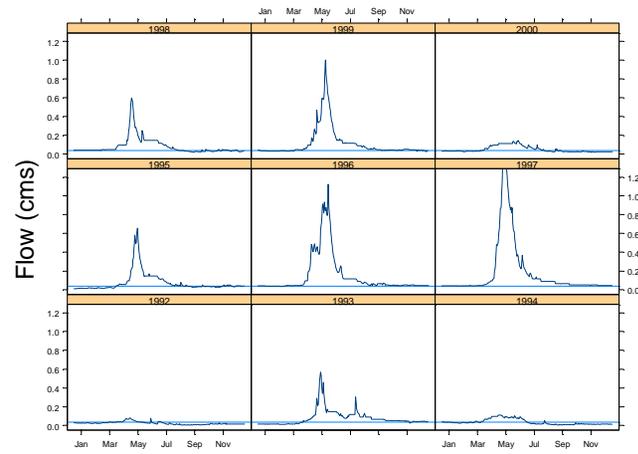
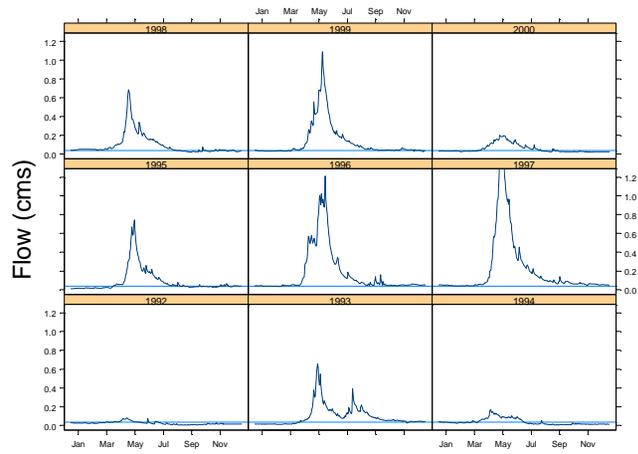
Station Name: Big Sheep Creek near Rossland
Station ID: 08NE039
Period of record: 1929-2000



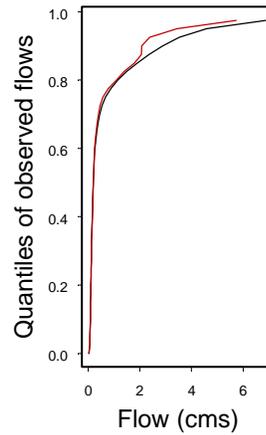
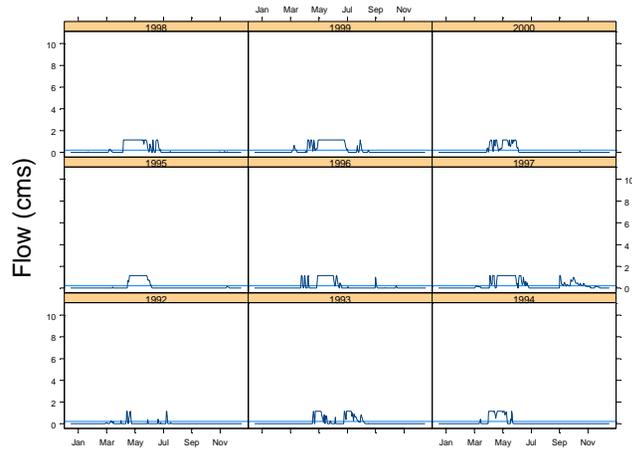
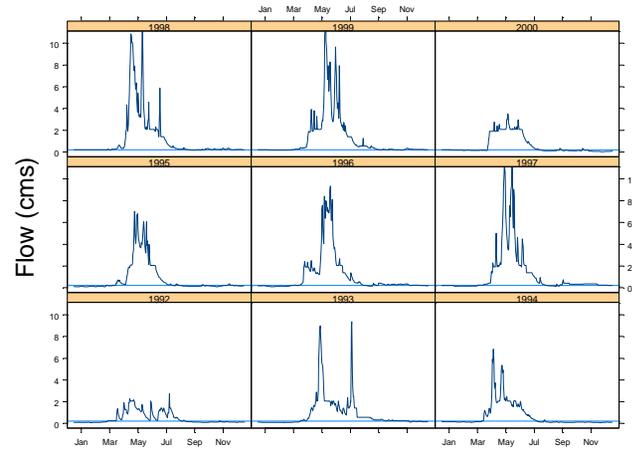
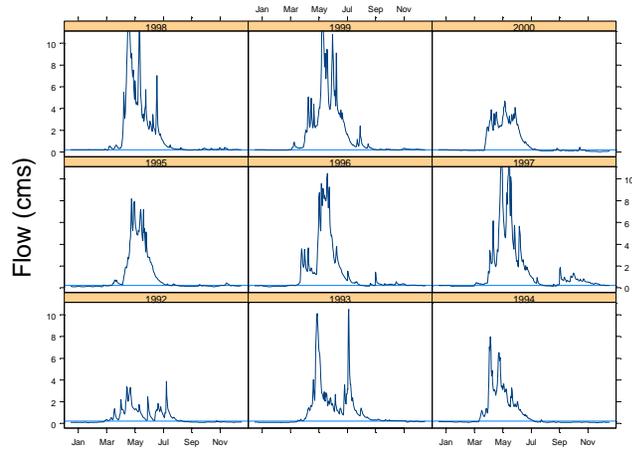
Station Name: Moyie River at Eastport
Station ID: 08NH006
Period of record: 1915-2000



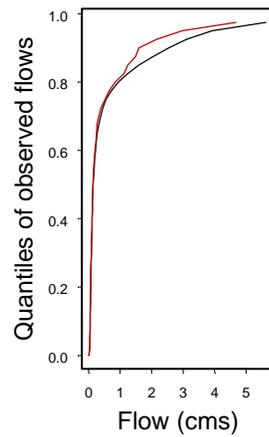
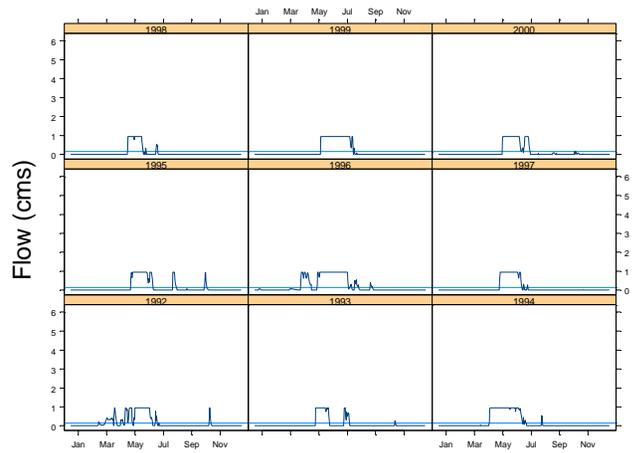
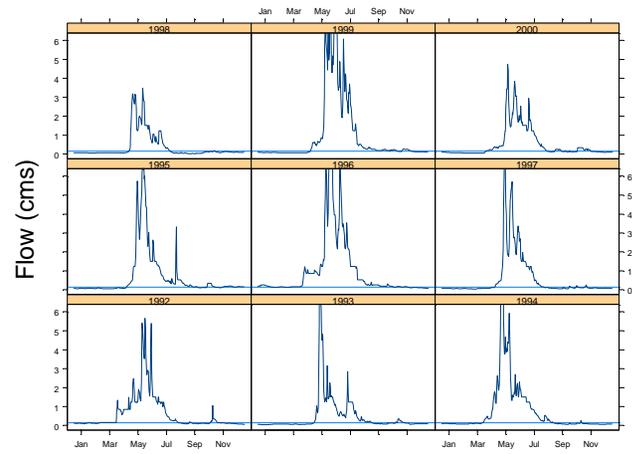
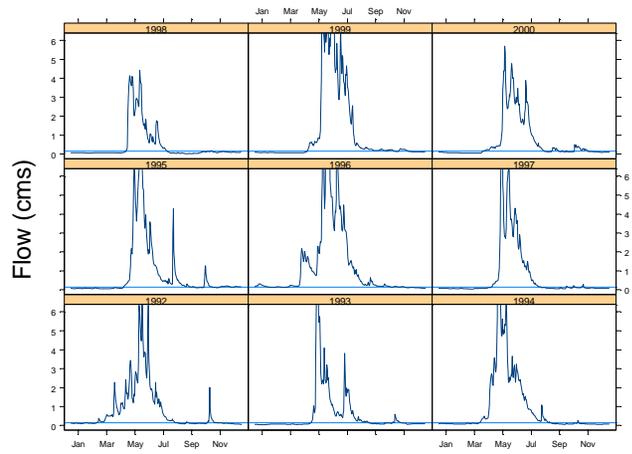
Station Name: Greata Creek near mouth
Station ID: 08NM173
Period of record: 1970-2000



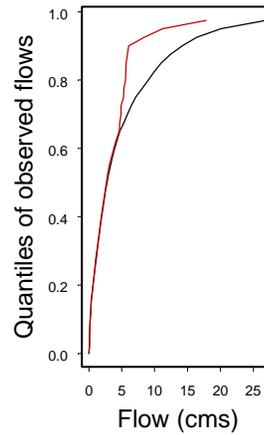
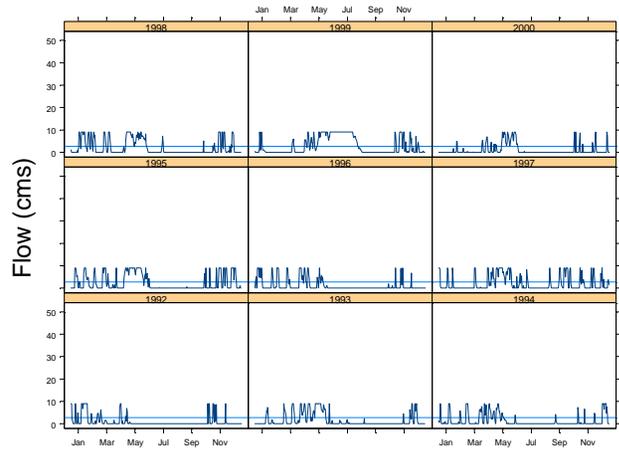
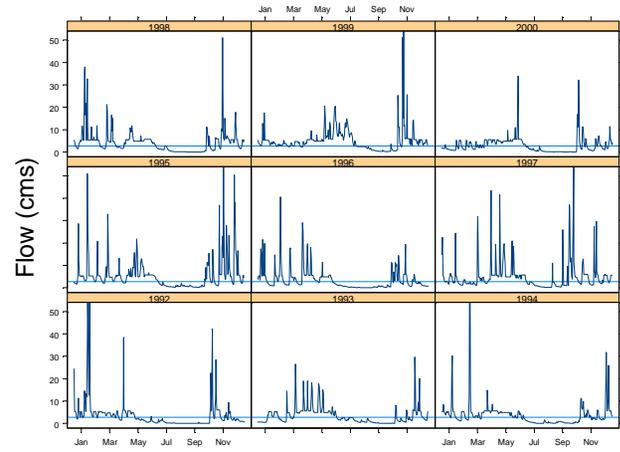
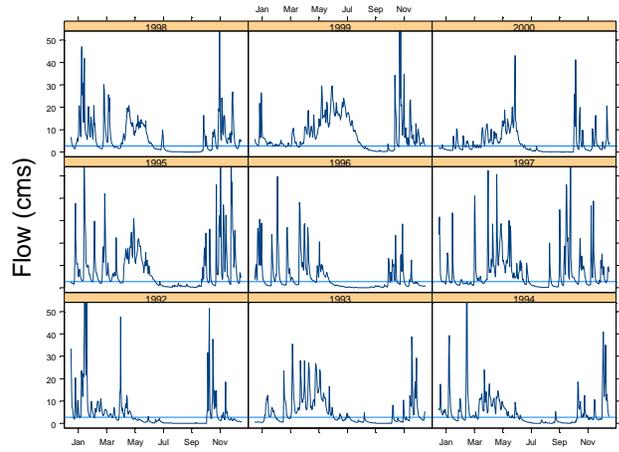
Station Name: Vaseux Creek above Solco Creek
Station ID: 08NM171
Period of record: 1970-2000



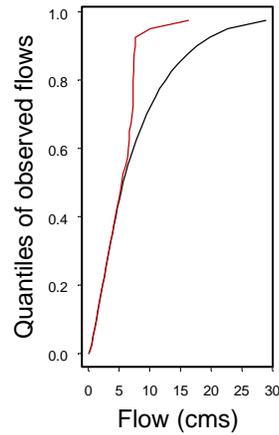
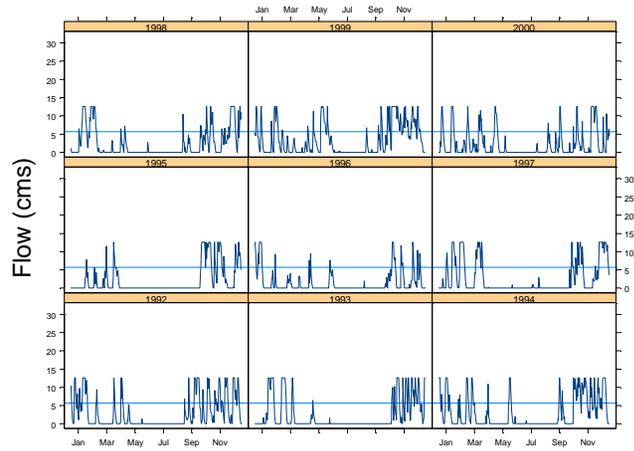
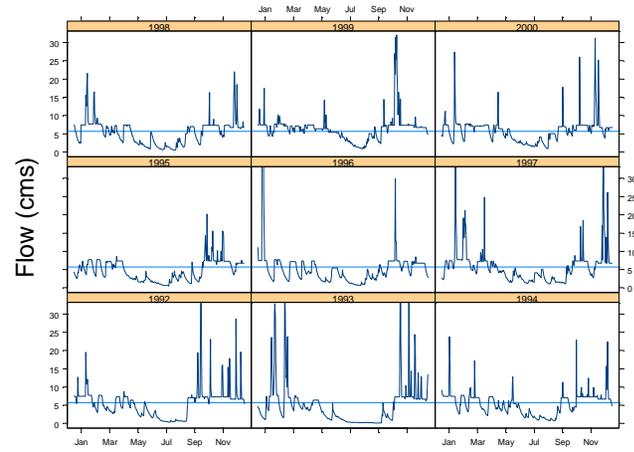
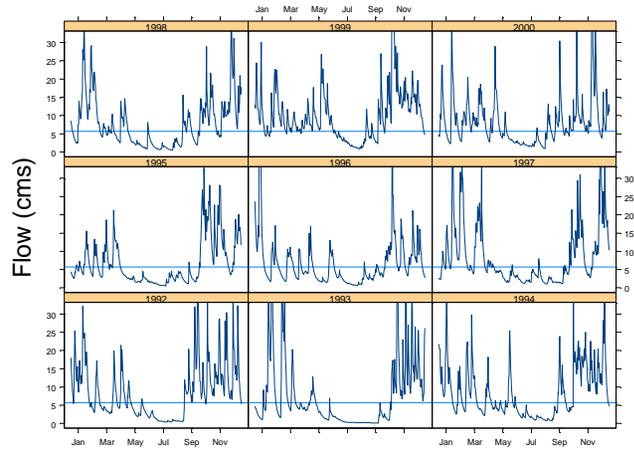
Station Name: Lingfield Creek at mouth
Station ID: 08MA006
Period of record: 1974-2000



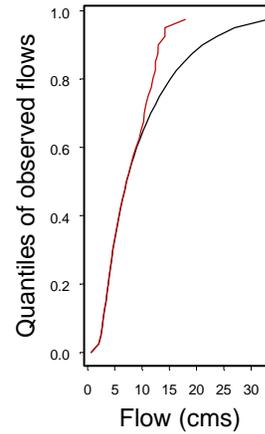
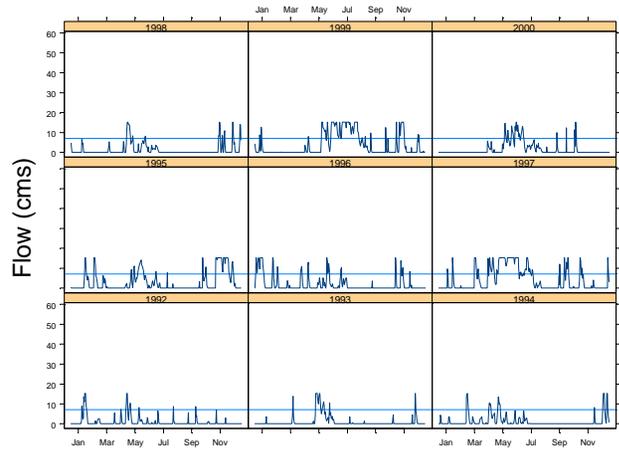
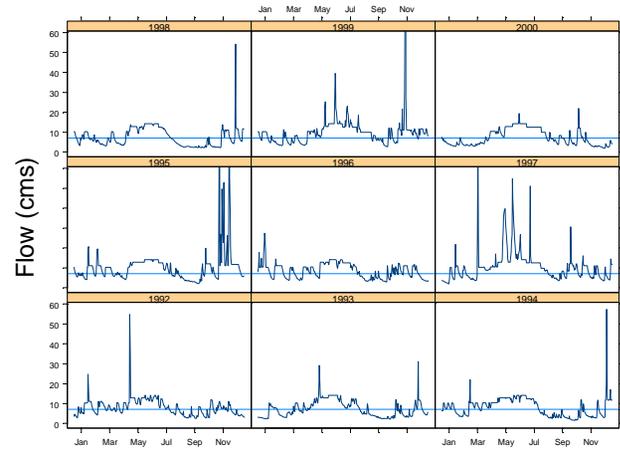
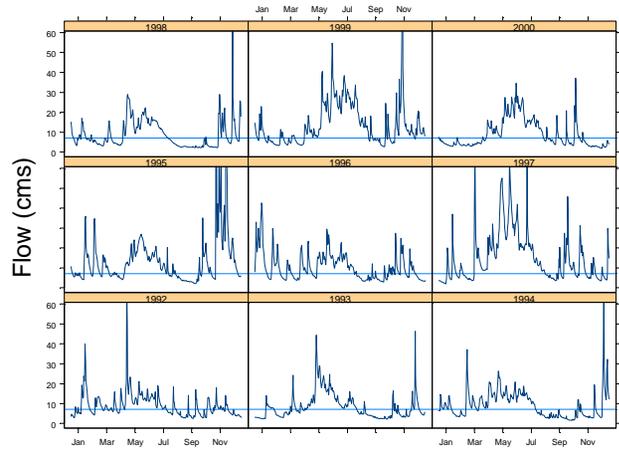
Station Name: Browns River near Courtenay
Station ID: 08HB025
Period of record: 1960-2000



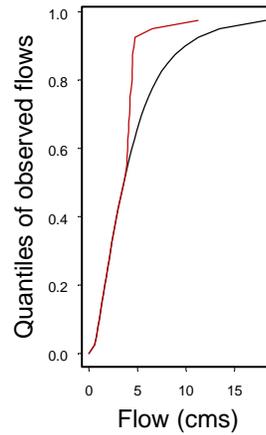
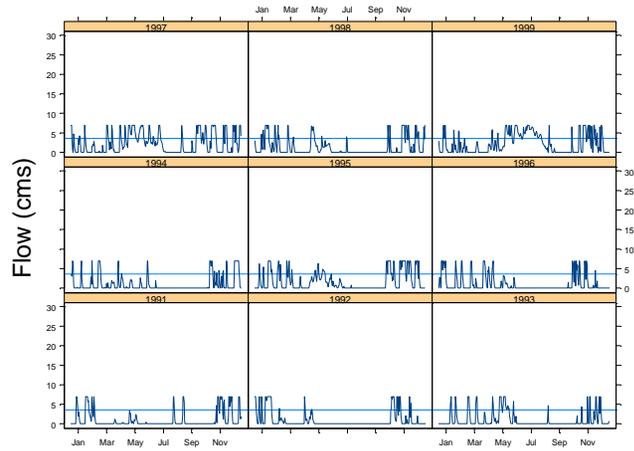
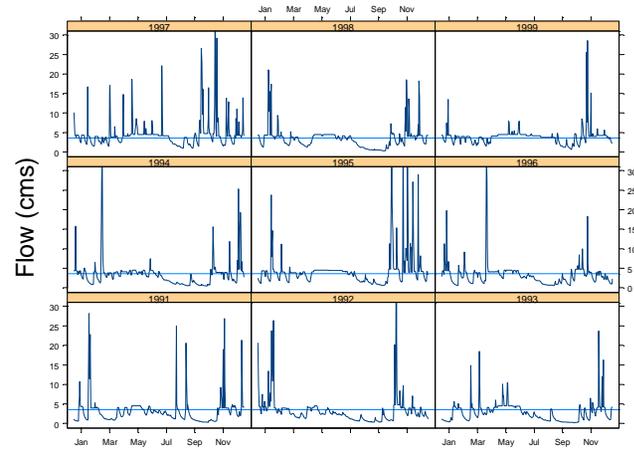
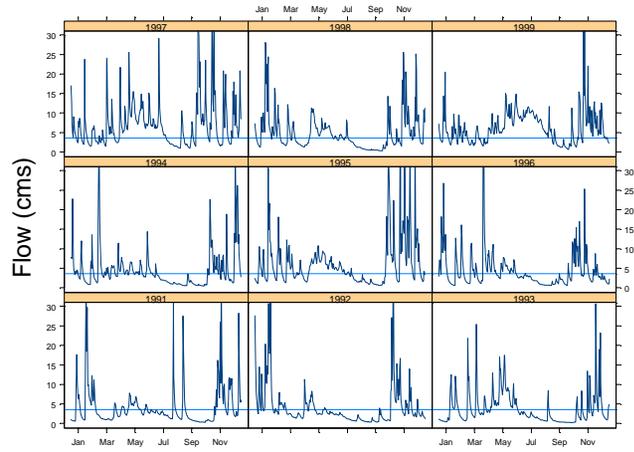
Station Name: Pallant Creek near Queen Charlotte
Station ID: 08OB002
Period of record: 1962-2000



Station Name: Sleese Creek near Vedder Crossing
Station ID: 08MH056
Period of record: 1957-2000



Station Name: Heber River, Vancouver Island (immediately u/s of diversion)
Station ID: BC Hydro inflow file
Period of record: 1959 – 1999



APPENDIX D.
EVALUATION OF SIMULATED POST-PROJECT FLOWS
FOR FISH-BEARING STREAMS

Nineteen sites on BC streams were selected for investigating the appropriateness of different standard-setting approaches (Table A1). This appendix presents statistical comparisons of flows on the selected streams: natural flows and simulated regulated flows using the proposed flow rule for fish-bearing streams. The comparison can be used to evaluate the performance of the proposed rule.

The statistical summaries allow comparisons to several existing flow criteria, including RVA statistics, and criteria from Tennant, BC modified-Tennant, and PHABSIM meta-analysis. Whether the flow thresholds provide sufficient protection for fish is ultimately a subjective decision. Our conclusion is that the recommended thresholds perform well as tools for screening proposed water uses on BC streams. For fish-bearing streams the diversion rules allow almost $\frac{1}{4}$ of available flows to be diverted on average, yet results indicate that alterations to the flow regime are nevertheless meeting the objective of low risk changes to fish habitat. For details of Methods used, please see Appendix B.

Carnation Creek

mad 0.825
 lat 48.915
 long 124.998

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.547	2.283	0.641	0.076		20
Feb	1.467	2.274	0.63	0.058		23.2
Mar	1.033	1.442	0.476	0.071		12.8
Apr	0.665	0.882	0.358	0.036		7.12
May	0.383	0.575	0.18	0.025		4.6
Jun	0.257	0.484	0.117	0.009		6.51
Jul	0.138	0.444	0.064	0.004		8.36
Aug	0.141	0.742	0.036	0.003		12.4
Sep	0.197	0.531	0.057	0.004		7.33
Oct	0.84	1.599	0.187	0.005		13.2
Nov	1.707	2.663	0.754	0.012		24.7
Dec	1.564	2.248	0.698	0.057		21.6
PoR	0.825	1.67	0.232	0.003		24.7
one_day_min	0.025	0.023	0.015	0.003	0.091	1693
three_day_min	0.026	0.023	0.016	0.0033	0.091	1638
seven_day_min	0.026	0.023	0.016	0.0037	0.091	1542
thirty_day_min	0.034	0.025	0.026	0.0067	0.097	1146
ninety_day_min	0.085	0.067	0.052	0.0108	0.316	1441
one_day_max	14.516	5.343	13.45	4.99	24.7	64
three_day_max	8.63	3.069	8.527	3.3267	15.89	142
seven_day_max	5.286	1.66	5.335	2.3933	9.281	300
thirty_day_max	2.719	0.852	2.673	1.1437	5.106	1152
ninety_day_max	1.983	0.506	1.932	1.0108	3.013	1608
julian_date_of_annual_minima	239.536	26.55	233.5	202	304	22
julian_date_of_annual_maxima	209.161	145.886	303	2	366	15
low_pulses	50.786	5.801	51	39	63	20
high_pulses	52.75	5.771	53	39	65	20
days_below_threshold	8	5.728	8.5	0	23	19
days_above_threshold	25.429	5.554	24.5	15	36	19
days_rising	102.786	8.408	103	88	124	18
days_falling	242.821	10.375	244	226	269	0
total days in period of record						10227
total years in period of record						28

fish species present chum
 coho
 chinook
 pink
 sculpin
 cutthroat
 steelhead

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	1.062	2.01	0.308	0.076	18.93	149
	0.998	2.01	0.33	0.058	22.13	107
	0.686	1.16	0.431	0.071	11.73	229
	0.451	0.60	0.358	0.036	6.05	803
	0.262	0.34	0.18	0.025	3.53	20
	0.178	0.30	0.117	0.009	5.44	21
	0.098	0.34	0.064	0.004	7.29	349
	0.103	0.63	0.036	0.003	11.33	302
	0.14	0.38	0.057	0.004	6.26	440
	0.639	1.30	0.187	0.005	12.13	355
	1.152	2.43	0.234	0.012	23.63	536
	1.045	1.98	0.276	0.057	20.53	171
	0.566	1.41	0.223	0.003	23.63	3482
	0.025	0.02	0.015	0.003	0.091	1676
	0.026	0.02	0.016	0.0033	0.091	1658
	0.026	0.02	0.016	0.0037	0.091	1604
	0.034	0.025	0.03	0.0067	0.097	1416
	0.067	0.045	0.05	0.0108	0.218	1191
	13.446	5.34	12.38	3.92	23.63	112
	7.563	3.07	7.457	2.2567	14.82	96
	4.324	1.59	4.432	1.8321	8.211	58
	1.982	0.768	2.00	0.7258	4.224	16
	1.379	0.43	1.33	0.6199	2.425	23
	239.536	26.55	233.5	202	304	26
	197.839	147.28	295.5	3	366	0
	39.429	5.82	40	29	50	18
	43.25	5.97	44.5	29	51	18
	8	5.73	8.5	0	23	25
	19.893	5.20	21	10	30	11
	90.607	8.15	91	74	106	0
	203.286	12.40	203	173	229	0
total days in period of record						10227
total years in period of record						28

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		743	868
Feb		683	791
Mar		783	868
Apr	448		840
May	246		868
Jun	139		840
Jul	58		868
Aug	41		868
Sep	106		840
Oct		450	868
Nov		735	840
Dec		766	868

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwinter	spawn	chan.maint	wet.link	total
Jan	743	502	743	274	114	381	868
Feb	683	467	683	241	101	338	791
Mar	783	446	783	191	50	302	868
Apr	667	343	667	93	21	184	840
May	465	185	465	50	5	95	868
Jun	284	98	284	26	3	55	840
Jul	117	39	117	12	2	19	868
Aug	61	30	61	14	6	24	868
Sep	173	80	173	21	6	47	840
Oct	450	297	450	148	56	206	868
Nov	735	525	735	293	114	399	840
Dec	766	534	766	274	115	396	868

summer winter total

Jan		743	868
Feb		683	791
Mar		783	868
Apr	448		840
May	246		868
Jun	26		840
Jul	12		868
Aug	14		868
Sep	106		840
Oct		450	868
Nov		735	840
Dec		766	868

	juv.rear	adult.rear	overwinter	spawn	chan.ma	wet.link	total
Jan	743	256	743.00	169	78	217	868
Feb	683	220	683.00	133	63	186	791
Mar	783	175	783.00	88	26	135	868
Apr	667	87	667.00	42	8	65	840
May	465	45	465.00	17	1	26	868
Jun	284	25	284.00	9	2	19	840
Jul	117	9	117.00	3	2	4	868
Aug	61	13	16.00	9	5	11	868
Sep	173	17	173.00	9	3	10	840
Oct	450	297	450.00	96	37	114	868
Nov	735	271	735.00	176	78	228	840
Dec	766	256	766.00	168	78	223	868

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.378	0.129	0.207	0.215	0.362	0.517	0.704	0.365	0.117	0.208	0.275	0.292	0.517	0.704
Feb	0.373	0.131	0.207	0.214	0.360	0.502	0.780	0.358	0.122	0.207	0.266	0.285	0.502	0.78
Mar	0.345	0.115	0.207	0.212	0.314	0.502	0.724	0.318	0.112	0.207	0.228	0.266	0.502	0.724
Apr	0.365	0.152	0.207	0.211	0.317	0.584	0.884	0.349	0.154	0.208	0.222	0.282	0.584	0.884
May	0.473	0.203	0.207	0.221	0.447	0.789	0.933	0.467	0.207	0.207	0.238	0.435	0.789	0.933
Jun	0.570	0.221	0.207	0.250	0.569	0.888	0.992	0.573	0.216	0.207	0.284	0.569	0.888	0.992
Jul	0.718	0.211	0.208	0.391	0.753	0.959	0.992	0.733	0.185	0.211	0.447	0.753	0.959	0.992
Aug	0.818	0.184	0.208	0.552	0.884	0.974	0.992	0.831	0.152	0.208	0.553	0.884	0.974	0.992
Sep	0.710	0.253	0.207	0.280	0.784	0.974	0.992	0.710	0.253	0.207	0.258	0.784	0.974	0.992
Oct	0.542	0.255	0.207	0.220	0.502	0.942	0.992	0.524	0.269	0.207	0.215	0.502	0.942	0.992
Nov	0.388	0.150	0.207	0.216	0.371	0.543	0.983	0.401	0.125	0.208	0.271	0.351	0.543	0.983
Dec	0.371	0.129	0.207	0.213	0.349	0.502	0.784	0.370	0.109	0.207	0.277	0.305	0.502	0.784

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.532	0.215	0.269	0.279	0.464	0.891	0.974	0.610	0.183	0.269	0.332	0.619	0.891	0.974
Feb	0.528	0.219	0.269	0.278	0.464	0.877	0.988	0.603	0.182	0.269	0.324	0.59	0.877	0.988
Mar	0.532	0.207	0.269	0.280	0.464	0.845	0.978	0.569	0.178	0.269	0.339	0.481	0.845	0.978
Apr	0.591	0.235	0.269	0.286	0.557	0.932	0.998	0.625	0.202	0.269	0.464	0.557	0.932	0.997
May	0.735	0.242	0.269	0.327	0.823	0.989	0.999	0.763	0.201	0.269	0.515	0.823	0.989	0.999
Jun	0.826	0.215	0.269	0.441	0.925	0.998	1.000	0.855	0.161	0.269	0.625	0.925	0.998	1
Jul	0.922	0.154	0.269	0.780	0.984	1.000	1.000	0.950	0.083	0.278	0.84	0.984	1	1
Aug	0.954	0.132	0.269	0.915	0.998	1.000	1.000	0.974	0.081	0.269	0.916	0.997	1	1
Sep	0.884	0.205	0.269	0.497	0.989	1.000	1.000	0.902	0.162	0.276	0.564	0.989	1	1
Oct	0.711	0.273	0.269	0.312	0.813	0.999	1.000	0.704	0.280	0.269	0.306	0.813	0.999	1
Nov	0.519	0.216	0.269	0.280	0.464	0.910	1.000	0.646	0.204	0.269	0.318	0.735	0.91	1
Dec	0.515	0.210	0.269	0.278	0.464	0.873	0.989	0.624	0.181	0.269	0.337	0.669	0.873	0.989

Coquihalla below Needle Creek

mad 3.27
 lat 49.541
 long 121.106

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.65	2.07	1.12	0.47	33.5	815
Feb	1.55	1.54	1.05	0.39	17.7	707
Mar	1.72	1.5	1.14	0.39	13.3	763
Apr	3.79	3.19	2.81	0.47	22.9	690
May	9.89	5.22	8.66	1.97	34.7	626
Jun	9.26	4.9	8.47	1.89	34.1	562
Jul	3.61	2.7	2.67	0.74	14.4	708
Aug	1.13	0.63	0.96	0.46	4.93	756
Sep	0.78	0.38	0.67	0.27	3.23	720
Oct	1.22	1.52	0.77	0.25	28.6	790
Nov	2.44	3.64	1.5	0.24	47.3	784
Dec	2.11	3	1.23	0.24	46	800
PoR	3.27	4.16	1.49	0.24	47.3	8721
one_day_min	0.5	0.17	0.47	0.24	0.98	1520
three_day_min	0.51	0.18	0.48	0.24	0.99	1531
seven_day_min	0.52	0.18	0.48	0.24	1	1549
thirty_day_min	0.58	0.2	0.54	0.25	1.07	1600
ninety_day_min	0.76	0.29	0.74	0.27	1.62	1780
one_day_max	23.14	8.76	20.45	13.8	47.3	333
three_day_max	20.12	6.09	19.13	11.21	34.9	342
seven_day_max	17.42	4.57	16.91	9.93	27.34	420
thirty_day_max	12.79	3.22	12.59	7.08	18.02	797
ninety_day_max	8.36	2.04	7.83	5.09	12.52	1505
julian_date_of_annual_minima	243.68	99.17	272	41	366	19
julian_date_of_annual_maxima	151.63	62.76	141	7	363	25
low_pulses	44.39	8.83	45.5	24	58	17
high_pulses	45.04	7.67	47	26	59	19
days_below_threshold	12.71	9.44	12.5	0	32	18
days_above_threshold	14.93	4.13	14.5	7	23	19
days_rising	113.39	9.72	113	93	134	21
days_falling	235.25	14.55	238.5	199	260	0
total days in period of record						10225
total years in period of record						28

fish species present	steelhead	bull trout
	rainbow	chinook
	summer steelhead	Dolly Varden
	chum	sculpin
	coho	sockeye
	pink	

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	1.4	1.39	1.12	0.47	28.57	0
	1.32	0.91	1.05	0.39	12.77	0
	1.46	0.87	1.14	0.39	8.37	0
	3	1.85	2.81	0.47	17.97	303
	7.05	3.67	5.41	1.97	29.77	639
	6.39	3.33	4.95	1.89	29.17	570
	2.92	1.48	2.67	0.74	9.47	277
	1.05	0.38	0.96	0.46	1.73	171
	0.73	0.25	0.67	0.27	1.18	51
	1.07	1.07	0.77	0.25	23.67	97
	2.03	2.71	1.5	0.24	42.37	60
	1.75	2.16	1.23	0.24	41.07	4
	2.52	2.82	1.46	0.24	42.37	2172
	0.5	0.17	0.47	0.24	0.98	0
	0.51	0.18	0.48	0.24	0.99	0
	0.52	0.18	0.48	0.24	1	0
	0.58	0.2	0.54	0.25	1.07	0
	0.75	0.27	0.74	0.27	1.46	0
	18.21	8.76	15.52	8.87	42.37	608
	15.2	6.07	14.2	6.28	29.97	796
	12.62	4.41	11.98	5.41	22.41	1543
	8.73	2.42	8.34	5.12	13.09	2076
	5.88	1.19	5.63	4.07	8.35	2832
	243.68	99.17	272	41	366	21
	152.5	62.31	141.75	7	362	13
	37.54	10.01	37.5	15	54	13
	36.5	8.24	36	19	50	8
	12.71	9.44	12.5	0	32	16
	9	3.19	10	3	15	16
	95.93	11.98	97	73	118	0
	201.25	20.98	204	158	230	0
						10225
						28

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		774	868
Feb		643	789
Mar		698	868
Apr	701		840
May	868		868
Jun	840		840
Jul	739		868
Aug	218		868
Sep	60		840
Oct		524	868
Nov		689	840
Dec		783	868

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwinte	spawn	chan.mair	wet.link	total
Jan	774	202	774	67	6	67	868
Feb	643	194	643	72	2	72	789
Mar	698	278	698	101	1	101	868
Apr	806	628	806	345	17	350	840
May	868	868	868	832	215	832	868
Jun	840	840	840	791	173	792	840
Jul	868	642	868	326	9	327	868
Aug	732	95	732	15	0	15	868
Sep	432	21	432	0	0	0	840
Oct	524	157	524	54	2	54	868
Nov	689	337	689	132	22	132	840
Dec	783	263	783	115	14	119	868

summer winter total

Jan		774	868
Feb		643	789
Mar		698	868
Apr	701		840
May	868		868
Jun	840		840
Jul	739		868
Aug	218		868
Sep	0		840
Oct		524	868
Nov		689	840
Dec		783	868

	juv.rear	adult.rear	overwinte	spawn	chan.ma	wet.link	total
Jan	774	202	774.00	14	2	14	868
Feb	643	194	643.00	5	0	5	789
Mar	698	278	698.00	5	0	5	868
Apr	806	628	806.00	345	3	350	840
May	868	868	868.00	832	70	832	868
Jun	840	840	840.00	791	43	792	840
Jul	868	642	868.00	326	0	327	868
Aug	732	0	732.00	0	0	0	868
Sep	432	0	432.00	0	0	0	840
Oct	524	157	524.00	2	1	2	868
Nov	689	337	689.00	42	9	42	840
Dec	783	263	783.00	26	5	29	868

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.268	0.0799	0.201	0.205	0.239	0.368	0.651		0.253	0.0618	0.201	0.205	0.229	0.347	0.651
Feb	0.285	0.0811	0.201	0.206	0.263	0.395	0.651		0.271	0.0655	0.201	0.206	0.256	0.369	0.651
Mar	0.286	0.082	0.201	0.205	0.26	0.394	0.651		0.269	0.0611	0.201	0.205	0.26	0.370	0.599
Apr	0.339	0.1403	0.201	0.209	0.289	0.609	0.651		0.304	0.0907	0.201	0.209	0.289	0.387	0.651
May	0.556	0.1164	0.215	0.375	0.61	0.651	0.651		0.49	0.1055	0.215	0.375	0.448	0.651	0.651
Jun	0.541	0.1287	0.212	0.329	0.603	0.651	0.651		0.463	0.1118	0.212	0.329	0.419	0.651	0.651
Jul	0.325	0.1366	0.201	0.206	0.259	0.558	0.651		0.29	0.084	0.201	0.206	0.259	0.377	0.64
Aug	0.263	0.0553	0.201	0.205	0.248	0.349	0.431		0.259	0.0553	0.201	0.205	0.243	0.345	0.431
Sep	0.324	0.0849	0.202	0.221	0.317	0.429	0.607		0.324	0.0845	0.216	0.216	0.317	0.429	0.607
Oct	0.333	0.1115	0.201	0.211	0.306	0.473	0.651		0.323	0.1113	0.201	0.211	0.285	0.454	0.651
Nov	0.312	0.137	0.201	0.204	0.247	0.591	0.651		0.296	0.123	0.201	0.204	0.247	0.537	0.651
Dec	0.291	0.1194	0.201	0.204	0.247	0.481	0.654		0.274	0.0991	0.201	0.204	0.247	0.344	0.654

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.464	0.142	0.271	0.285	0.45	0.684	0.787		0.455	0.145	0.275	0.275	0.441	0.671	0.787
Feb	0.494	0.16	0.271	0.287	0.482	0.721	0.838		0.482	0.169	0.271	0.272	0.469	0.721	0.838
Mar	0.473	0.164	0.271	0.277	0.447	0.723	0.842		0.459	0.172	0.271	0.277	0.431	0.723	0.842
Apr	0.408	0.148	0.271	0.275	0.345	0.684	0.783		0.367	0.118	0.271	0.275	0.345	0.551	0.783
May	0.57	0.132	0.271	0.353	0.627	0.684	0.684		0.49	0.12	0.271	0.353	0.434	0.684	0.684
Jun	0.554	0.145	0.271	0.314	0.618	0.684	0.684		0.46	0.126	0.271	0.314	0.402	0.684	0.684
Jul	0.386	0.121	0.271	0.274	0.339	0.575	0.684		0.346	0.077	0.271	0.274	0.339	0.465	0.668
Aug	0.501	0.139	0.271	0.305	0.502	0.688	0.794		0.503	0.136	0.31	0.31	0.502	0.688	0.794
Sep	0.625	0.148	0.271	0.42	0.651	0.792	0.918		0.633	0.134	0.42	0.42	0.651	0.792	0.918
Oct	0.582	0.198	0.271	0.29	0.598	0.813	0.933		0.575	0.206	0.271	0.271	0.598	0.813	0.933
Nov	0.465	0.199	0.271	0.276	0.386	0.776	0.939		0.449	0.2	0.271	0.276	0.366	0.776	0.939
Dec	0.465	0.16	0.271	0.281	0.44	0.675	0.94		0.448	0.164	0.271	0.281	0.413	0.665	0.94

Coquihalla near Hope

mad 32.1
 lat 49.375
 long 121.419

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	22.9	24.7	15.4	5	256	626
Feb	23.1	19.7	16.8	4.9	232	556
Mar	20.9	15.8	15.9	8.1	144	628
Apr	32.5	17.7	27.8	10.4	132	544
May	73.4	36.2	64.6	18.8	246	496
Jun	74.6	39.7	65.1	12.3	246	461
Jul	32.7	24.1	23.7	5.7	163	543
Aug	12.2	7.4	9.8	3.5	58	584
Sep	11.3	8.8	8.8	2.7	92	589
Oct	20	27.9	13.9	3.5	572	637
Nov	26.3	21.9	21.5	3.6	283	584
Dec	35	41	21.9	4.4	490	624
PoR	32.1	32.8	20.2	2.7	572	6872
one_day_min	5.8	2.2	5.1	2.7	12	837
three_day_min	6	2.2	5.3	3.5	12	814
seven_day_min	6.3	2.2	5.6	3.6	12	796
thirty_day_min	7.9	2.6	8	4.3	15	965
ninety_day_min	11.1	3.3	10.8	5.4	18	956
one_day_max	233.9	111.6	197	132	572	158
three_day_max	174.6	52.9	166.6	116.7	305	179
seven_day_max	137	28.7	130.4	86.7	191	218
thirty_day_max	93	27.2	88	55.2	167	763
ninety_day_max	65.1	18.2	61.7	42.7	114	1312
julian_date_of_annual_minima	245.6	77.6	262.5	9	365	19
julian_date_of_annual_maxima	190	101.2	155.5	22	361	14
low_pulses	53.9	10.7	52	42	81	16
high_pulses	54.3	10.4	50.5	42	80	17
days_below_threshold	11.9	4.8	13	0	20	15
days_above_threshold	17.7	4.4	17.5	9	26	14
days_rising	122.5	14.1	120.5	98	152	15
days_falling	231.5	18.7	239	189	256	0
total days in period of record						8035
total years in period of record						22

fish species present steelhead bull trout
 rainbow chinook
 summer steelhead Dolly Varden
 chum sculpin
 coho sockeye
 pink

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	19.5	16.6	15.4	5	208	0
	19.5	11.8	16.8	4.9	184	0
	17.8	7.8	15.9	8.1	96	0
	27.1	8.2	27.8	10.4	84	0
	50	21.3	43.9	18.8	198	0
	50.2	24.3	42.1	12.3	198	0
	26.3	13	23.7	5.7	115	0
	11.1	4.6	9.8	3.5	20	0
	10.2	5.3	8.8	2.7	44	0
	16.8	21.9	13.9	3.5	524	0
	21.7	13.4	21.5	3.6	235	0
	28.6	30.6	21.9	4.4	442	0
	24.9	21	19.9	2.7	524	0
	5.8	2.2	5.1	2.7	12	0
	6	2.2	5.3	3.5	12	0
	6.3	2.2	5.6	3.6	12	0
	7.8	2.5	8	4.3	14	0
	10.8	3.2	10.5	5.4	17	0
	186.3	111.6	149.4	84.4	524	2816
	127.5	52.5	119	69.1	258	2399
	92.7	27.4	82.8	51.8	144	1919
	60.1	18.2	53.6	41.6	119	566
	44.9	9.6	42.9	34.3	74	0
	245.6	77.6	262.5	9	365	19
	183.9	107.3	154	20	362	7
	43.8	9.3	42.5	27	65	16
	40.8	7.3	40	29	57	11
	11.9	4.8	13	0	20	18
	8.4	3.4	7.5	3	16	7
	99.4	13.5	98	73	129	1
	190	22	191	155	224	0
total days in period of record						8035
total years in period of record						22

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		651	682
Feb		613	621
Mar		682	682
Apr	648		660
May	682		682
Jun	659		660
Jul	557		682
Aug	212		682
Sep	168		660
Oct		581	682
Nov		627	660
Dec		679	682

	summer	winter	total
Jan		651	682
Feb		613	621
Mar		682	682
Apr	648		660
May	682		682
Jun	659		660
Jul	557		682
Aug	212		682
Sep	168		660
Oct		581	682
Nov		627	660
Dec		679	682

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwinte	spawn	chan.mair	wet.link	total
Jan	651	297	651	388	7	112	682
Feb	613	297	613	392	3	110	621
Mar	682	278	682	456	3	76	682
Apr	660	577	660	637	1	237	660
May	682	682	682	682	53	635	682
Jun	660	653	660	658	78	583	660
Jul	676	463	676	540	1	260	682
Aug	574	101	574	171	0	21	682
Sep	471	91	471	147	0	20	660
Oct	581	263	581	342	3	84	682
Nov	627	416	627	511	4	134	660
Dec	679	432	679	522	21	219	682

	juv.rear	adult.rear	overwinte	spawn	chan.ma	wet.link	total
Jan	651	297	651	388	4	21	682
Feb	613	297	613	392	1	15	621
Mar	682	278	682	456	0	10	682
Apr	660	577	660	637	0	237	660
May	682	682	682	682	10	635	682
Jun	660	653	660	658	15	583	660
Jul	676	463	676	540	0	260	682
Aug	574	101	574	171	0	0	682
Sep	471	91	471	147	0	1	660
Oct	581	263	581	342	1	16	682
Nov	627	416	627	511	1	20	660
Dec	679	432	679	522	10	219	682

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.378	0.1663	0.203	0.213	0.32	0.635	0.854		0.359	0.1318	0.203	0.213	0.32	0.529	0.854
Feb	0.392	0.1632	0.203	0.226	0.343	0.648	0.854		0.369	0.1222	0.203	0.226	0.343	0.523	0.854
Mar	0.372	0.1354	0.207	0.25	0.33	0.561	0.854		0.349	0.0896	0.207	0.25	0.33	0.455	0.854
Apr	0.513	0.1417	0.237	0.343	0.498	0.713	0.854		0.477	0.0964	0.237	0.343	0.498	0.561	0.828
May	0.74	0.1119	0.371	0.585	0.76	0.854	0.854		0.666	0.0848	0.371	0.585	0.654	0.796	0.854
Jun	0.732	0.1297	0.269	0.527	0.762	0.854	0.854		0.658	0.1051	0.269	0.527	0.643	0.832	0.854
Jul	0.484	0.1957	0.203	0.241	0.444	0.769	0.854		0.454	0.1548	0.203	0.241	0.444	0.623	0.854
Aug	0.275	0.0972	0.203	0.204	0.23	0.413	0.735		0.262	0.0625	0.203	0.204	0.23	0.387	0.387
Sep	0.269	0.1	0.203	0.203	0.226	0.395	0.845		0.257	0.0661	0.203	0.203	0.226	0.395	0.657
Oct	0.354	0.1635	0.203	0.204	0.293	0.587	0.854		0.333	0.1238	0.203	0.204	0.293	0.501	0.854
Nov	0.433	0.1627	0.203	0.235	0.411	0.686	0.854		0.402	0.1175	0.203	0.235	0.411	0.516	0.854
Dec	0.468	0.1934	0.204	0.246	0.417	0.771	0.854		0.444	0.1613	0.204	0.246	0.417	0.607	0.854

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.4	0.1637	0.268	0.27	0.33	0.653	0.913		0.376	0.1206	0.268	0.27	0.33	0.529	0.913
Feb	0.406	0.1648	0.268	0.27	0.334	0.67	0.913		0.377	0.1124	0.268	0.27	0.334	0.521	0.913
Mar	0.373	0.1424	0.268	0.27	0.314	0.565	0.913		0.346	0.0866	0.268	0.27	0.314	0.448	0.913
Apr	0.517	0.1608	0.268	0.326	0.49	0.751	0.913		0.474	0.1042	0.268	0.326	0.49	0.566	0.886
May	0.782	0.1325	0.356	0.593	0.816	0.913	0.913		0.693	0.1011	0.356	0.593	0.678	0.853	0.913
Jun	0.772	0.1523	0.272	0.526	0.818	0.913	0.913		0.682	0.1239	0.272	0.526	0.663	0.890	0.913
Jul	0.501	0.2069	0.268	0.275	0.433	0.825	0.913		0.465	0.1546	0.268	0.275	0.433	0.640	0.913
Aug	0.339	0.0843	0.268	0.272	0.305	0.462	0.781		0.323	0.0546	0.268	0.272	0.305	0.394	0.577
Sep	0.359	0.0947	0.268	0.272	0.331	0.477	0.903		0.345	0.0699	0.268	0.272	0.331	0.442	0.697
Oct	0.406	0.15	0.268	0.276	0.354	0.596	0.913		0.382	0.1018	0.268	0.276	0.354	0.493	0.913
Nov	0.451	0.1644	0.268	0.277	0.417	0.719	0.913		0.413	0.1071	0.268	0.277	0.417	0.510	0.913
Dec	0.482	0.2072	0.268	0.273	0.412	0.827	0.913		0.452	0.1666	0.268	0.273	0.412	0.618	0.913

Skagit

mad 28.3
 lat 49.047
 long 121.096

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	13.6	13.5	10.6	2.8	147	710
Feb	13.2	12.2	9.3	2.3	108	616
Mar	11.8	6.3	11.1	2.8	43	596
Apr	30	19.4	25.4	4.2	119	564
May	77.1	38.9	67.7	21.4	267	529
Jun	84.4	43.3	80.7	16.4	289	554
Jul	41.2	30.1	33.1	7.2	205	619
Aug	14.4	8.1	12.7	4.8	61	633
Sep	9.2	5	7.9	3.9	33	636
Oct	11.7	10.6	8	3.3	80	698
Nov	15.2	15	12.4	2.5	184	705
Dec	17.5	14.4	14.3	2.7	150	683
PoR	28.3	33.2	14.9	2.3	289	7543
one_day_min	4.9	2.1	4.4	2.3	12	1728
three_day_min	5	2.1	4.5	2.3	12	1756
seven_day_min	5.2	2.2	4.6	2.4	12	1815
thirty_day_min	6.1	2.6	5.2	2.7	14	2064
ninety_day_min	8	3.6	7.3	3.7	17	2366
one_day_max	155.2	50.6	150	67.4	289	386
three_day_max	146	50.2	140.7	63.3	282	491
seven_day_max	131.9	47.7	122.1	52.6	265	717
thirty_day_max	102.4	36.8	98.1	33.4	194	1099
ninety_day_max	71.5	22	74.5	27.7	122	1613
julian_date_of_annual_minima	231.1	115.2	277	4	361	18
julian_date_of_annual_maxima	159.5	39.1	150	134	339	23
low_pulses	30.3	7.7	31	16	41	17
high_pulses	32.5	7.2	34	12	42	17
days_below_threshold	7.9	6.1	7	0	19	16
days_above_threshold	10.5	3.7	10	1	20	21
days_rising	103.7	17.7	108	42	127	20
days_falling	218	25.3	228	138	249	0
total days in period of record						9131
total years in period of record						25

fish species present Dolly Varden
 rainbow
 cutthroat

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
11.7	7.7	10.6	2.8	105	0	
11.9	8	9.3	2.3	66	0	
11	4.4	11.1	2.8	18	0	
25.4	11.3	25.4	4.2	77	0	
57.8	24.2	54.2	21.4	225	0	
59.5	31.1	49	16.4	247	0	
33.4	18.6	33.1	7.2	163	0	
13.2	5	12.7	4.8	21	0	
8.7	3.4	7.9	3.9	16	0	
10.4	6.5	8	3.3	38	0	
13.6	9.9	12.4	2.5	142	0	
15.3	8.9	14.3	2.7	108	0	
22.7	22.5	14.9	2.3	247	0	
4.9	2.1	4.4	2.3	12	0	
5	2.1	4.5	2.3	12	0	
5.2	2.2	4.6	2.4	12	0	
5.9	2.6	5.2	2.7	14	0	
7.9	3.4	7.3	3.7	17	0	
115.4	47	107.8	42.5	247	3488	
107.2	45.3	98.5	41	240	3409	
94.3	42	80	37.3	222	3297	
71.7	27.2	64	31.3	152	1911	
52.3	13.1	52	27.3	88	67	
231.1	115.2	277	4	361	17	
149.4	13	148	121	185	17	
24.9	7.9	24	9	38	2	
25.8	6.6	26	9	37	0	
7.9	6.1	7	0	19	19	
6.4	2.3	7	1	11	2	
87	17.5	92	35	113	0	
182.6	30.9	191	102	230	0	
total days in period of record						9131
total years in period of record						25

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		637	775
Feb		562	706
Mar		677	775
Apr	669		750
May	775		775
Jun	750		750
Jul	731		775
Aug	440		775
Sep	146		750
Oct		504	775
Nov		587	750
Dec		697	775

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	637	200	637	280	2	46	775
Feb	562	180	562	210	0	44	706
Mar	677	164	677	279	0	21	775
Apr	730	546	730	634	2	331	750
May	775	775	775	775	135	735	775
Jun	750	750	750	750	142	706	750
Jul	775	666	775	710	27	449	775
Aug	752	277	752	379	0	35	775
Sep	587	78	587	119	0	7	750
Oct	504	188	504	240	0	41	775
Nov	587	267	587	356	2	53	750
Dec	697	356	697	426	2	101	775

	summer	winter	total
Jan		637	775
Feb		562	706
Mar		677	775
Apr	669		750
May	775		775
Jun	750		750
Jul	731		775
Aug	440		775
Sep	146		750
Oct		504	775
Nov		587	750
Dec		697	775

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	637	200	637	280	0	14	775
Feb	562	180	562	210	0	6	706
Mar	677	164	677	279	0	0	775
Apr	730	546	730	634	0	331	750
May	775	775	775	775	28	735	775
Jun	750	750	750	750	47	706	750
Jul	775	666	775	710	9	449	775
Aug	752	277	752	379	0	0	775
Sep	587	78	587	119	0	0	750
Oct	504	188	504	240	0	7	775
Nov	587	267	587	356	1	13	750
Dec	697	356	697	426	0	11	775

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.307	0.1252	0.207	0.21	0.265	0.429	0.852
Feb	0.312	0.1326	0.207	0.209	0.259	0.501	0.852
Mar	0.29	0.0889	0.207	0.209	0.269	0.398	0.676
Apr	0.501	0.1821	0.207	0.26	0.496	0.759	0.852
May	0.764	0.1085	0.439	0.583	0.802	0.852	0.852
Jun	0.781	0.109	0.36	0.618	0.843	0.852	0.852
Jul	0.578	0.1844	0.212	0.309	0.589	0.836	0.852
Aug	0.321	0.1111	0.207	0.211	0.293	0.463	0.78
Sep	0.252	0.07	0.207	0.209	0.224	0.347	0.589
Oct	0.295	0.1204	0.207	0.21	0.239	0.451	0.842
Nov	0.333	0.1358	0.207	0.211	0.291	0.501	0.852
Dec	0.362	0.1481	0.207	0.212	0.324	0.57	0.852

	mean	std.dev	min	ptile.10	median	ptile.90	max
	0.291	0.0868	0.207	0.21	0.265	0.399	0.852
	0.302	0.1069	0.207	0.209	0.259	0.501	0.796
	0.278	0.0609	0.207	0.209	0.269	0.378	0.378
	0.475	0.1479	0.207	0.26	0.496	0.630	0.832
	0.73	0.0918	0.439	0.583	0.748	0.852	0.852
	0.725	0.0934	0.36	0.618	0.717	0.852	0.852
	0.549	0.1536	0.212	0.309	0.589	0.671	0.852
	0.307	0.0798	0.207	0.211	0.293	0.427	0.427
	0.244	0.0451	0.207	0.209	0.224	0.347	0.347
	0.282	0.0862	0.207	0.21	0.239	0.447	0.641
	0.322	0.1099	0.207	0.211	0.291	0.479	0.852
	0.343	0.1131	0.207	0.212	0.324	0.496	0.852

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.371	0.1262	0.271	0.274	0.332	0.542	0.904
Feb	0.393	0.1362	0.271	0.275	0.336	0.581	0.904
Mar	0.342	0.0808	0.271	0.275	0.314	0.451	0.707
Apr	0.522	0.1908	0.271	0.287	0.503	0.803	0.904
May	0.806	0.1225	0.436	0.604	0.852	0.904	0.904
Jun	0.825	0.1228	0.347	0.639	0.895	0.904	0.904
Jul	0.6	0.2021	0.271	0.301	0.61	0.889	0.904
Aug	0.349	0.0958	0.271	0.274	0.317	0.462	0.828
Sep	0.335	0.0662	0.271	0.274	0.311	0.428	0.61
Oct	0.392	0.1109	0.271	0.278	0.373	0.52	0.895
Nov	0.399	0.1275	0.271	0.278	0.366	0.564	0.904
Dec	0.405	0.1412	0.271	0.275	0.36	0.618	0.904

	mean	std.dev	min	ptile.10	median	ptile.90	max
	0.353	0.0923	0.271	0.274	0.332	0.441	0.904
	0.382	0.1136	0.271	0.275	0.336	0.513	0.847
	0.328	0.0563	0.271	0.275	0.314	0.379	0.639
	0.492	0.15	0.271	0.287	0.503	0.654	0.884
	0.769	0.1041	0.436	0.604	0.79	0.904	0.904
	0.764	0.1055	0.347	0.639	0.757	0.904	0.904
	0.566	0.1662	0.271	0.301	0.61	0.700	0.904
	0.333	0.054	0.271	0.274	0.317	0.422	0.422
	0.325	0.0526	0.271	0.274	0.311	0.400	0.506
	0.378	0.0809	0.271	0.278	0.373	0.484	0.666
	0.385	0.1008	0.271	0.278	0.366	0.481	0.904
	0.383	0.1023	0.271	0.275	0.36	0.503	0.904

Bings

mad 0.472
 lat 48.789
 long 123.724

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.259	1.6242	0.716	0.068	14.8	930
Feb	1.041	1.1111	0.7	0.139	13.9	821
Mar	0.803	0.9759	0.557	0.099	13	937
Apr	0.346	0.3081	0.246	0.073	3.68	879
May	0.138	0.0903	0.113	0.022	0.696	863
Jun	0.065	0.0394	0.054	0.015	0.44	824
Jul	0.035	0.0186	0.031	0.004	0.167	810
Aug	0.026	0.0271	0.023	0.003	0.538	974
Sep	0.026	0.0175	0.022	0.002	0.147	785
Oct	0.088	0.2006	0.031	0.003	3.17	963
Nov	0.568	0.8972	0.205	0.018	7.68	879
Dec	1.285	1.4504	0.745	0.015	12	906
PoR	0.472	0.9416	0.125	0.002	14.8	10571
one_day_min	0.013	0.0065	0.012	0.002	0.025	1048
three_day_min	0.014	0.007	0.012	0.0023	0.029	1170
seven_day_min	0.015	0.0081	0.014	0.003	0.035	1473
thirty_day_min	0.019	0.0091	0.018	0.0035	0.047	1942
ninety_day_min	0.026	0.0113	0.023	0.0069	0.058	2115
one_day_max	7.654	3.6462	7	2.18	14.8	137
three_day_max	5.537	2.2294	5.183	1.6733	10.503	207
seven_day_max	3.927	1.6107	3.956	1.345	9.424	443
thirty_day_max	2.078	0.7729	2.059	0.7917	3.925	1358
ninety_day_max	1.5	0.4752	1.582	0.7886	2.473	1701
julian_date_of_annual_minima	245.409	20.4391	248.5	199	285	22
julian_date_of_annual_maxima	188.424	160.6908	79	2.5	366	16
low_pulses	31.242	14.4547	32	10	58	21
high_pulses	37.727	14.1979	40	15	66	21
days_below_threshold	4.485	4.2214	3	0	14	21
days_above_threshold	14.364	4.9486	14	4	28	24
days_rising	86.394	19.2418	86	54	133	20
days_falling	176.636	29.1417	180	128	236	0
total days in period of record						12053
total years in period of record						33

fish species present brown trout
 chun
 coho
 cutthroat
 steelhead

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	0.91	1.48	0.379	0.068	14.139	48
	0.7	0.9574	0.371	0.139	13.239	10
	0.576	0.8334	0.446	0.099	12.339	148
	0.261	0.1665	0.246	0.073	3.019	988
	0.118	0.0425	0.113	0.022	0.179	0
	0.059	0.0241	0.054	0.015	0.097	0
	0.033	0.0136	0.031	0.004	0.057	0
	0.023	0.01	0.023	0.003	0.042	0
	0.024	0.012	0.022	0.002	0.045	0
	0.061	0.1104	0.031	0.003	2.509	250
	0.45	0.7145	0.205	0.018	7.019	322
	0.906	1.2871	0.321	0.015	11.339	110
	0.342	0.7838	0.118	0.002	14.139	1876
	0.013	0.0065	0.012	0.002	0.025	1990
	0.014	0.007	0.012	0.0023	0.029	1851
	0.015	0.0081	0.014	0.003	0.035	1802
	0.019	0.0085	0.018	0.0035	0.042	1677
	0.024	0.0089	0.023	0.0069	0.045	1601
	6.993	3.6462	6.339	1.5188	14.139	35
	4.876	2.2295	4.522	1.0121	9.842	38
	3.275	1.6071	3.32	0.7151	8.763	23
	1.578	0.7113	1.572	0.5521	3.439	3
	1.081	0.3905	1.162	0.5061	1.912	0
	245.409	20.4391	248.5	199	285	33
	188.394	160.694	79	2.5	366	0
	25.121	12.9874	22	7	47	10
	29.879	13.1595	28	10	54	10
	4.485	4.2214	3	0	14	29
	10.515	3.8981	10	3	20	16
	72.03	14.7107	70	50	101	0
	133.515	27.8973	135	95	195	0
total days in period of record						12053
total years in period of record						33

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		1017	1023
Feb		932	932
Mar		1023	1023
Apr	686		990
May	168		1023
Jun	19		990
Jul	0		1023
Aug	5		1023
Sep	0		990
Oct		172	1023
Nov		625	990
Dec		978	1023

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	1017	904	1017	393	175	706	1023
Feb	932	839	932	323	129	640	932
Mar	1023	874	1023	221	76	607	1023
Apr	963	455	963	47	4	192	990
May	687	92	687	0	0	17	1023
Jun	147	5	147	0	0	0	990
Jul	11	0	11	0	0	0	1023
Aug	11	3	11	0	0	1	1023
Sep	8	0	8	0	0	0	990
Oct	172	62	172	14	1	37	1023
Nov	625	439	625	182	69	348	990
Dec	978	858	978	433	221	698	1023

summer winter total

Jan		1017	1023
Feb		932	932
Mar		1023	1023
Apr	686		990
May	0		1023
Jun	0		990
Jul	0		1023
Aug	0		1023
Sep	0		990
Oct		172	1023
Nov		625	990
Dec		978	1023

juv.rear adult.rear overwint spawn chan.mair wet.link total

Jan	1017	904	1017	227	111	338	1023
Feb	932	839	932	153	76	251	932
Mar	1023	874	1023	96	37	162	1023
Apr	963	455	963	8	2	27	990
May	687	0	687	0	0	0	1023
Jun	147	0	147	0	0	0	990
Jul	0	0	0	0	0	0	1023
Aug	0	0	0	0	0	0	1023
Sep	0	0	0	0	0	0	990
Oct	172	14	172	2	1	7	1023
Nov	625	439	625	84	48	348	990
Dec	978	858	978	271	138	389	1023

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.309	0.0946	0.198	0.201	0.278	0.429	0.636	0.266	0.0926	0.198	0.2	0.207	0.429	0.636
Feb	0.295	0.0858	0.198	0.201	0.265	0.429	0.429	0.25	0.0797	0.198	0.2	0.2	0.429	0.429
Mar	0.275	0.0781	0.198	0.2	0.244	0.429	0.503	0.238	0.0687	0.198	0.199	0.2	0.351	0.503
Apr	0.293	0.0917	0.198	0.201	0.261	0.429	0.612	0.283	0.0932	0.199	0.205	0.247	0.426	0.612
May	0.461	0.15	0.199	0.247	0.459	0.66	0.908	0.473	0.1323	0.315	0.315	0.459	0.660	0.908
Jun	0.679	0.1482	0.199	0.467	0.707	0.845	0.953	0.691	0.1246	0.509	0.509	0.707	0.845	0.953
Jul	0.829	0.105	0.337	0.69	0.845	0.94	0.995	0.838	0.085	0.69	0.69	0.845	0.940	0.995
Aug	0.886	0.0944	0.202	0.777	0.902	0.969	0.995	0.896	0.0628	0.778	0.778	0.902	0.969	0.995
Sep	0.88	0.097	0.375	0.759	0.908	0.974	0.995	0.89	0.0709	0.759	0.759	0.908	0.974	0.995
Oct	0.751	0.2183	0.198	0.337	0.845	0.934	0.995	0.757	0.2052	0.199	0.33	0.845	0.934	0.995
Nov	0.474	0.2272	0.198	0.214	0.429	0.826	0.934	0.457	0.2383	0.198	0.214	0.416	0.826	0.934
Dec	0.339	0.1236	0.198	0.202	0.321	0.429	0.953	0.303	0.1275	0.198	0.209	0.233	0.429	0.953

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.389	0.1223	0.269	0.273	0.387	0.561	0.94	0.412	0.10943	0.27	0.3	0.388	0.561	0.94
Feb	0.376	0.1056	0.269	0.272	0.361	0.54	0.777	0.412	0.08716	0.27	0.304	0.398	0.540	0.777
Mar	0.389	0.1261	0.269	0.272	0.35	0.588	0.875	0.402	0.11513	0.27	0.335	0.335	0.588	0.875
Apr	0.553	0.1865	0.269	0.294	0.562	0.812	0.932	0.581	0.15354	0.27	0.436	0.562	0.812	0.932
May	0.797	0.1558	0.272	0.567	0.842	0.95	0.998	0.827	0.09668	0.686	0.686	0.842	0.950	0.998
Jun	0.938	0.0761	0.339	0.848	0.965	0.993	1	0.95	0.04101	0.878	0.878	0.965	0.993	1
Jul	0.984	0.0258	0.712	0.96	0.993	0.999	1	0.988	0.01298	0.96	0.96	0.993	0.999	1
Aug	0.991	0.0421	0.298	0.983	0.998	1	1	0.996	0.00541	0.983	0.983	0.998	1.000	1
Sep	0.991	0.021	0.758	0.979	0.998	1	1	0.995	0.00679	0.979	0.979	0.998	1.000	1
Oct	0.919	0.1722	0.27	0.669	0.993	0.999	1	0.94	0.11634	0.27	0.706	0.993	0.999	1
Nov	0.646	0.2885	0.269	0.282	0.634	0.991	0.999	0.638	0.29766	0.27	0.271	0.634	0.991	0.999
Dec	0.421	0.1683	0.269	0.275	0.395	0.681	1	0.461	0.15467	0.27	0.3	0.452	0.681	1

Chemainus

mad 18.94
 lat 48.878
 long 123.702

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	35.45	42.83	20.85	0.091	456	1283
Feb	31.55	37	19.7	1.77	537	1189
Mar	24.82	22.96	18.85	2.7	303	1305
Apr	22.31	15.29	18.5	2.03	202	1178
May	14.98	11.45	12	1.42	86	1170
Jun	6.99	7.38	4.65	0.578	87.8	1212
Jul	2.43	2.98	1.5	0.227	49.9	1277
Aug	1.16	3.78	0.69	0.127	122	1388
Sep	1.74	3.55	0.74	0.127	66.3	1290
Oct	12.22	23.58	3.76	0.206	416	1295
Nov	33.18	43.92	19.05	0.273	374	1239
Dec	41.19	49.42	24.7	0.071	457	1275
PoR	18.94	30.75	10	0.071	537	15101
one_day_min	0.44	0.28	0.37	0.071	1.1	1884
three_day_min	0.46	0.28	0.38	0.095	1.1	1913
seven_day_min	0.49	0.29	0.43	0.138	1.3	1978
thirty_day_min	0.63	0.35	0.55	0.19	1.4	1906
ninety_day_min	1.22	0.81	0.93	0.306	4.6	1738
one_day_max	245.12	107.31	232	71.4	537	197
three_day_max	165.63	71.92	155.2	53.4	371.7	405
seven_day_max	117.47	53.69	106.94	38.386	301.9	851
thirty_day_max	65.53	25.24	60.91	22.941	149.7	1967
ninety_day_max	47.39	14.06	47.08	26.56	91.4	2610
julian_date_of_annual_minima	243.55	19.64	240	186	294	33
julian_date_of_annual_maxima	199.87	152.74	308	1	365	26
low_pulses	47.35	9.95	49	25	74	31
high_pulses	48.57	10.04	49.5	24	74	30
days_below_threshold	9.8	5.38	9	2	24	29
days_above_threshold	18.93	5.87	18	6	34	33
days_rising	112.63	11.39	112.5	91	141	30
days_falling	234.85	18.39	238	175	264	0
total days in period of record						16802
total years in period of record						46

fish species present atlantic salmon Dolly Varden
 chinook pink
 chum rainbow
 coho steelhead
 cutthroat

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	23.64	35.82	13.5	0.091	428.5	4
	21.21	30.41	14.8	1.77	509.5	0
	16.71	16.79	15.3	2.7	275.5	0
	14.94	8.76	15.3	2.03	174.5	2
	10.81	5.17	12	1.42	58.5	436
	5.41	3.79	4.65	0.578	60.3	863
	1.97	1.45	1.5	0.227	22.4	933
	0.89	2.59	0.69	0.127	94.5	724
	1.21	1.48	0.74	0.127	38.8	408
	9.32	17.97	3.76	0.206	388.5	101
	22.4	36.71	12.5	0.273	346.5	2
	26.89	43.13	11.2	0.071	429.5	0
	12.91	24.31	9.8	0.071	509.5	3473
	0.44	0.28	0.37	0.071	1.1	4
	0.46	0.28	0.38	0.095	1.1	2
	0.49	0.29	0.43	0.138	1.3	0
	0.62	0.35	0.55	0.19	1.4	0
	1.08	0.54	0.92	0.306	2.6	0
	217.62	107.31	204.5	43.9	509.5	7960
	138.25	71.78	127.7	27.5	344.2	5749
	91.34	52.56	79.44	19	274.4	4017
	45.38	22.67	40.48	14.813	126.1	2267
	31.9	12.02	30.22	16.911	74.4	2137
	243.55	19.64	240	186	294	46
	214.33	148.44	313.25	1	366	0
	33.17	8.59	34	16	53	19
	34.3	8.74	35.5	16	55	14
	9.74	5.29	9.5	2	24	42
	11.39	4.4	11	3	21	27
	85	13.79	85.5	53	112	0
	170.76	27.11	176.5	99	213	0
total days in period of record						16802
total years in period of record						46

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		1381	1426
Feb		1288	1300
Mar		1418	1426
Apr	1314		1380
May	1013		1426
Jun	403		1380
Jul	75		1426
Aug	15		1426
Sep	61		1380
Oct		711	1426
Nov		1272	1380
Dec		1418	1426

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	1381	1090	1381	1110	147	778	1426
Feb	1288	1053	1288	1075	96	673	1300
Mar	1418	1188	1418	1211	43	711	1426
Apr	1366	1187	1366	1217	13	670	1380
May	1343	800	1343	839	2	370	1426
Jun	799	272	799	291	2	76	1380
Jul	235	32	235	33	0	5	1426
Aug	47	7	47	8	1	4	1426
Sep	132	36	132	38	0	10	1380
Oct	711	424	711	436	36	277	1426
Nov	1272	939	1272	954	145	693	1380
Dec	1418	1183	1418	1214	197	846	1426

summer winter total

Jan		1381	1426
Feb		1288	1300
Mar		1418	1426
Apr	1314		1380
May	1013		1426
Jun	403		1380
Jul	1		1426
Aug	2		1426
Sep	2		1380
Oct		711	1426
Nov		1272	1380
Dec		1418	1426

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	1381	1090	1381	1110	80	327	1426
Feb	1288	1053	1288	1075	54	228	1300
Mar	1418	1188	1418	1211	21	127	1426
Apr	1366	1187	1366	1217	5	77	1380
May	1343	800	1343	839	0	38	1426
Jun	799	11	799	12	0	6	1380
Jul	235	1	235	1	0	1	1426
Aug	2	2	2	2	1	2	1426
Sep	3	1	3	1	0	1	1380
Oct	711	424	711	436	16	277	1426
Nov	1272	939	1272	954	88	271	1380
Dec	1418	1183	1418	1214	119	375	1426

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.531	0.22	0.2	0.223	0.521	0.818	0	0.971	0.427	0.1841	0.2	0.223	0.377	0.794	0.971
Feb	0.52	0.203	0.2	0.238	0.497	0.818	0	0.818	0.421	0.1535	0.2	0.238	0.406	0.687	0.818
Mar	0.497	0.177	0.2	0.259	0.483	0.754	0	0.818	0.401	0.1146	0.2	0.259	0.414	0.441	0.818
Apr	0.49	0.162	0.2	0.287	0.476	0.720	0	0.818	0.393	0.0854	0.2	0.287	0.414	0.414	0.818
May	0.382	0.163	0.2	0.208	0.345	0.626	0	0.818	0.321	0.0888	0.2	0.208	0.345	0.379	0.818
Jun	0.314	0.12	0.2	0.203	0.273	0.482	0	0.818	0.285	0.0895	0.2	0.203	0.273	0.412	0.818
Jul	0.446	0.184	0.2	0.219	0.417	0.711	0	0.921	0.439	0.1902	0.202	0.202	0.412	0.711	0.921
Aug	0.649	0.192	0.2	0.372	0.682	0.892	0	0.96	0.658	0.1738	0.364	0.364	0.681	0.892	0.96
Sep	0.616	0.23	0.2	0.265	0.657	0.890	0	0.96	0.61	0.2363	0.208	0.219	0.656	0.890	0.96
Oct	0.494	0.217	0.2	0.214	0.484	0.818	0	0.932	0.472	0.2035	0.2	0.214	0.484	0.785	0.932
Nov	0.503	0.221	0.2	0.214	0.497	0.818	0	0.897	0.4	0.1837	0.2	0.214	0.354	0.799	0.897
Dec	0.562	0.211	0.2	0.261	0.577	0.818	0	0.977	0.426	0.1957	0.2	0.261	0.325	0.818	0.977

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.559	0.222	0.271	0.28	0.518	0.863	1	1	0.439	0.1927	0.271	0.28	0.348	0.842	1
Feb	0.535	0.212	0.271	0.284	0.486	0.863	0.863	0.863	0.417	0.1606	0.271	0.284	0.373	0.717	0.863
Mar	0.502	0.188	0.271	0.28	0.465	0.792	0.863	0.863	0.387	0.1169	0.271	0.28	0.383	0.442	0.863
Apr	0.491	0.176	0.271	0.286	0.461	0.752	0.863	0.863	0.375	0.0873	0.271	0.286	0.383	0.383	0.863
May	0.416	0.153	0.271	0.275	0.36	0.657	0.863	0.863	0.346	0.0836	0.271	0.275	0.349	0.411	0.863
Jun	0.482	0.191	0.271	0.275	0.427	0.792	0.97	0.97	0.454	0.1987	0.271	0.275	0.366	0.788	0.97
Jul	0.728	0.224	0.271	0.34	0.792	0.965	0.998	0.998	0.734	0.2111	0.363	0.363	0.792	0.965	0.998
Aug	0.898	0.147	0.271	0.737	0.955	0.995	1	1	0.92	0.0842	0.521	0.737	0.955	0.995	1
Sep	0.846	0.205	0.271	0.461	0.947	0.995	1	1	0.855	0.1824	0.275	0.45	0.947	0.995	1
Oct	0.657	0.26	0.271	0.287	0.706	0.978	0.999	0.999	0.63	0.263	0.271	0.287	0.577	0.978	0.999
Nov	0.551	0.219	0.271	0.278	0.528	0.863	0.995	0.995	0.434	0.2007	0.271	0.278	0.325	0.863	0.995
Dec	0.58	0.226	0.271	0.286	0.579	0.863	1	1	0.428	0.2138	0.271	0.286	0.301	0.863	1

Louis

mad 2.72
 lat 51.135
 long 120.123

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.69	0.33	0.61	0.142	1.89	552
Feb	0.69	0.32	0.6	0.161	2.27	452
Mar	1	0.4	0.94	0.364	3.11	547
Apr	2.47	2.32	1.61	0.3	14.7	640
May	11.22	6.45	9.66	1.4	43.3	532
Jun	8.32	6.66	5.91	0.813	36.5	577
Jul	2.77	2.13	2.22	0.32	12.5	602
Aug	1.24	1.12	1.09	0.028	12.6	692
Sep	1.08	0.73	1.01	0.068	6.09	597
Oct	1.1	0.49	1.07	0.28	4.14	536
Nov	1.12	0.53	1.01	0.362	3.27	491
Dec	0.85	0.39	0.71	0.207	2.4	541
PoR	2.72	4.36	1.13	0.028	43.3	6759
one_day_min	0.36	0.17	0.33	0.028	0.7	1124
three_day_min	0.37	0.17	0.35	0.039	0.7	1180
seven_day_min	0.4	0.18	0.36	0.066	0.73	1288
thirty_day_min	0.49	0.2	0.47	0.122	0.89	1795
ninety_day_min	0.6	0.23	0.55	0.276	1.22	2011
one_day_max	23.58	8.68	22.15	9.66	43.3	292
three_day_max	22.05	8.13	20.95	8.997	39.73	325
seven_day_max	19.81	7.2	18.03	8.716	31.51	386
thirty_day_max	13.94	4.84	12.05	6.877	22.63	621
ninety_day_max	7.91	2.8	6.92	4.116	12.75	1334
julian_date_of_annual_minima	127.08	134.09	45	2	366	18
julian_date_of_annual_maxima	141.29	13.21	141.5	120	169	16
low_pulses	48.63	17.22	49	17	85	17
high_pulses	49.75	16.11	49.5	23	84	15
days_below_threshold	11.92	11.23	8.5	0	40	18
days_above_threshold	13.92	6.04	13	5	33	20
days_rising	145	13.77	147.5	115	168	15
days_falling	189.46	22.77	190.5	148	221	1
total days in period of record						8766
total years in period of record						24

fish species present bull trout mountain whitefish
 chinook sculpin
 coho rainbow
 Dolly Varden

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	0.67	0.28	0.61	0.142	1.16	8
	0.67	0.28	0.6	0.161	1.16	1
	0.95	0.29	0.94	0.364	1.4	0
	2.14	1.59	1.61	0.3	11.74	467
	9.16	5.66	6.7	1.4	40.34	425
	7.08	5.61	5.8	0.813	33.54	489
	2.37	1.36	2.22	0.32	9.54	321
	1.12	0.75	1.09	0.028	9.64	179
	0.98	0.42	1.01	0.068	3.13	93
	1.04	0.37	1.07	0.28	1.6	54
	1.07	0.42	1.01	0.362	1.73	0
	0.82	0.31	0.71	0.207	1.35	3
	2.35	3.6	1.13	0.028	40.34	2040
	0.36	0.17	0.33	0.028	0.7	17
	0.37	0.17	0.35	0.039	0.7	15
	0.4	0.18	0.36	0.066	0.73	18
	0.49	0.2	0.47	0.122	0.89	7
	0.59	0.21	0.55	0.276	1.06	0
	20.62	8.68	19.19	6.7	40.34	528
	19.1	8.11	17.99	6.315	36.77	817
	16.89	7.15	15.07	6.126	28.55	910
	11.42	4.41	9.4	5.628	19.67	1103
	6.54	2.19	5.71	3.544	10.69	1532
	127.08	134.09	45	2	366	20
	141.76	12.65	141.5	122	169	17
	43.54	15.41	43.5	16	73	7
	43	15.61	42	21	72	5
	11.92	11.23	8.5	0	40	15
	10.96	4.85	10.5	4	22	12
	130.92	19.86	134.5	81	158	12
	166.75	23.66	167.5	116	209	0
total days in period of record						8766
total years in period of record						24

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		435	744
Feb		401	678
Mar		687	744
Apr	581		720
May	744		744
Jun	708		720
Jul	621		744
Aug	375		744
Sep	308		720
Oct		673	744
Nov		637	720
Dec		589	744

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	435	26	435	0	0	0	744
Feb	401	5	401	0	0	0	678
Mar	687	63	687	3	0	3	744
Apr	695	385	695	163	12	185	720
May	744	743	744	726	319	727	744
Jun	720	697	720	599	186	619	720
Jul	715	537	715	232	5	272	744
Aug	611	177	611	22	2	29	744
Sep	592	96	592	17	0	19	720
Oct	673	130	673	4	0	5	744
Nov	637	160	637	4	0	6	720
Dec	589	57	589	0	0	0	744

	summer	winter	total
Jan		435	744
Feb		401	678
Mar		687	744
Apr	581		720
May	744		744
Jun	708		720
Jul	621		744
Aug	375		744
Sep	308		720
Oct		673	744
Nov		637	720
Dec		589	744

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	435	0	435	0	0	0	744
Feb	401	0	401	0	0	0	678
Mar	687	0	687	0	0	0	744
Apr	695	385	695	163	1	185	720
May	744	743	744	726	214	727	744
Jun	720	697	720	599	124	619	720
Jul	715	537	715	232	0	272	744
Aug	611	177	611	12	0	14	744
Sep	592	96	592	1	0	3	720
Oct	673	130	673	0	0	0	744
Nov	637	160	637	0	0	0	720
Dec	589	0	589	0	0	0	744

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.342	0.1154	0.205	0.215	0.323	0.489	0.78		0.342	0.1151	0.212	0.212	0.323	0.489	0.78
Feb	0.339	0.1104	0.205	0.211	0.323	0.483	0.744		0.339	0.1099	0.211	0.211	0.323	0.483	0.744
Mar	0.257	0.0534	0.205	0.207	0.236	0.339	0.475		0.254	0.0545	0.205	0.205	0.234	0.339	0.475
Apr	0.287	0.114	0.205	0.205	0.23	0.47	0.615		0.272	0.0903	0.205	0.205	0.23	0.355	0.615
May	0.562	0.094	0.205	0.403	0.615	0.615	0.615		0.535	0.0918	0.205	0.403	0.553	0.615	0.615
Jun	0.477	0.1406	0.205	0.257	0.508	0.615	0.615		0.461	0.1303	0.205	0.257	0.503	0.615	0.615
Jul	0.31	0.1133	0.205	0.21	0.276	0.496	0.615		0.289	0.0802	0.205	0.21	0.276	0.370	0.615
Aug	0.299	0.1514	0.205	0.205	0.23	0.515	0.987		0.292	0.1493	0.205	0.205	0.22	0.469	0.987
Sep	0.288	0.1235	0.205	0.206	0.235	0.472	0.922		0.282	0.1226	0.205	0.206	0.226	0.452	0.922
Oct	0.258	0.0718	0.205	0.206	0.223	0.343	0.565		0.255	0.0724	0.205	0.206	0.22	0.343	0.565
Nov	0.259	0.0586	0.205	0.208	0.232	0.357	0.477		0.255	0.0596	0.205	0.208	0.224	0.357	0.477
Dec	0.293	0.0818	0.205	0.209	0.284	0.413	0.669		0.292	0.0828	0.205	0.205	0.284	0.413	0.669

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.638	0.167	0.283	0.404	0.656	0.843	0.981		0.644	0.157	0.404	0.405	0.656	0.843	0.981
Feb	0.637	0.164	0.273	0.403	0.657	0.839	0.973		0.641	0.157	0.403	0.403	0.657	0.839	0.973
Mar	0.493	0.128	0.272	0.337	0.477	0.68	0.833		0.498	0.122	0.345	0.345	0.477	0.680	0.833
Apr	0.398	0.123	0.272	0.277	0.364	0.61	0.883		0.383	0.116	0.272	0.277	0.34	0.553	0.883
May	0.571	0.102	0.272	0.382	0.631	0.631	0.631		0.538	0.1	0.272	0.382	0.552	0.631	0.631
Jun	0.488	0.138	0.272	0.285	0.504	0.631	0.631		0.468	0.126	0.272	0.285	0.494	0.631	0.631
Jul	0.391	0.138	0.272	0.274	0.325	0.631	0.866		0.368	0.127	0.272	0.274	0.322	0.579	0.866
Aug	0.497	0.2	0.272	0.29	0.431	0.821	1		0.495	0.199	0.273	0.292	0.428	0.821	1
Sep	0.511	0.181	0.272	0.324	0.452	0.813	0.998		0.512	0.179	0.272	0.327	0.449	0.813	0.998
Oct	0.475	0.152	0.272	0.302	0.431	0.685	0.898		0.478	0.148	0.313	0.313	0.431	0.685	0.898
Nov	0.474	0.15	0.272	0.288	0.449	0.705	0.834		0.476	0.147	0.298	0.298	0.449	0.705	0.834
Dec	0.562	0.156	0.272	0.351	0.589	0.774	0.948		0.566	0.149	0.354	0.354	0.589	0.774	0.948

Lemieux

mad 3.08
 lat 51.425
 long 120.200

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.89	0.42	0.87	0.06	2.8	517
Feb	0.8	0.33	0.79	0.155	1.88	426
Mar	1.04	0.59	0.93	0.229	3.87	536
Apr	4.67	5.12	2.7	0.326	33.6	580
May	13.33	7.20	11.8	2.95	43.3	528
Jun	6.9	6.06	4.8	0.593	46.9	561
Jul	3.57	3.30	2.73	0.186	22.5	598
Aug	1.77	1.69	1.25	0.023	9.75	592
Sep	1.04	1.00	0.7	0.021	5.41	558
Oct	0.8	0.69	0.62	0.028	3.93	562
Nov	1.04	0.73	0.88	0.054	4.19	522
Dec	1.01	0.69	0.84	0.045	3.47	512
PoR	3.08	4.91	1.16	0.021	46.9	6492
one_day_min	0.31	0.18	0.32	0.021	0.76	859
three_day_min	0.32	0.18	0.32	0.021	0.78	908
seven_day_min	0.34	0.18	0.35	0.023	0.78	966
thirty_day_min	0.4	0.20	0.45	0.043	0.77	1212
ninety_day_min	0.53	0.26	0.53	0.063	0.89	1628
one_day_max	24.52	10.92	23.25	9	46.9	396
three_day_max	23.49	10.34	21.92	8.807	43.93	420
seven_day_max	21.44	8.90	19.83	8.68	38.91	443
thirty_day_max	15.48	5.60	14.31	6.241	25.81	656
ninety_day_max	8.94	3.57	7.69	3.865	18.53	1509
julian_date_of_annual_minima	201.59	134.66	264.75	1	365	12
julian_date_of_annual_maxima	134.91	12.70	135	114	165	17
low_pulses	39.05	10.88	39	20	57	14
high_pulses	39.5	10.98	39	18	58	15
days_below_threshold	10.91	9.95	7	0	37	17
days_above_threshold	10.18	4.71	10.5	2	24	16
days_rising	139.41	15.87	139.5	96	167	18
days_falling	189.23	24.27	196	144	214	1
total days in period of record						8035
total years in period of record						22

fish species present Chinook
 Coho
 Kokanee
 Rainbow
 Sockeye

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	0.85	0.34	0.87	0.06	1.33	41
	0.78	0.3	0.79	0.155	1.21	1
	0.96	0.41	0.93	0.229	1.68	2
	4.03	4.02	2.7	0.326	29.7	250
	10.72	6.17	7.9	2.95	39.4	335
	5.93	4.81	4.8	0.593	43	539
	3.04	2.31	2.73	0.186	18.6	243
	1.53	1.07	1.25	0.023	5.85	180
	0.93	0.71	0.7	0.021	2.31	190
	0.69	0.42	0.62	0.028	1.41	194
	0.93	0.49	0.88	0.054	1.73	61
	0.93	0.52	0.84	0.045	1.84	41
	2.62	3.96	1.16	0.021	43	2077
	0.31	0.18	0.32	0.021	0.76	218
	0.32	0.18	0.32	0.021	0.78	225
	0.34	0.18	0.35	0.023	0.78	232
	0.4	0.2	0.45	0.043	0.77	238
	0.53	0.26	0.53	0.063	0.89	215
	20.78	10.71	19.35	7.58	43	682
	19.76	10.11	18.02	7.58	40.03	906
	17.79	8.57	15.93	7.58	35.01	987
	12.31	4.84	10.85	5.864	21.91	1219
	7.33	2.71	6.37	3.477	14.63	1453
	201.59	134.66	264.75	1	365	16
	134.8	12.51	133.5	114	165	13
	34.05	10.83	30.5	19	55	7
	33.27	11.44	31	18	55	4
	10.91	9.95	7	0	37	15
	7.32	3.21	8	2	13	6
	124.73	16.7	126.5	96	152	12
	165.45	27.64	162	124	208	0
total days in period of record						8035
total years in period of record						22

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		507	682
Feb		400	621
Mar		508	682
Apr	543		660
May	682		682
Jun	640		660
Jul	556		682
Aug	344		682
Sep	192		660
Oct		342	682
Nov		490	660
Dec		467	682

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	507	24	507	0	0	0	682
Feb	400	1	400	0	0	0	621
Mar	508	80	508	10	0	14	682
Apr	632	501	632	279	52	289	660
May	682	682	682	677	319	679	682
Jun	659	625	659	503	97	513	660
Jul	644	500	644	294	26	304	682
Aug	523	274	523	86	0	90	682
Sep	373	122	373	33	0	35	660
Oct	342	47	342	14	0	16	682
Nov	490	82	490	19	0	20	660
Dec	467	110	467	10	0	11	682

	summer	winter	total
Jan		507	682
Feb		400	621
Mar		508	682
Apr	543		660
May	682		682
Jun	640		660
Jul	556		682
Aug	344		682
Sep	192		660
Oct		342	682
Nov		490	660
Dec		467	682

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	507	0	507	0	0	0	682
Feb	400	0	400	0	0	0	621
Mar	508	0	508	0	0	0	682
Apr	632	501	632	279	27	289	660
May	682	682	682	677	170	679	682
Jun	659	625	659	503	69	513	660
Jul	644	500	644	294	9	304	682
Aug	523	274	523	16	0	17	682
Sep	373	122	373	0	0	0	660
Oct	342	0	342	0	0	0	682
Nov	490	82	490	0	0	0	660
Dec	467	110	467	0	0	0	682

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.259	0.1423	0.156	0.16	0.206	0.416	0.907		0.259	0.1424	0.16	0.16	0.206	0.416	0.907
Feb	0.267	0.1229	0.157	0.164	0.224	0.422	0.699		0.267	0.1224	0.166	0.166	0.224	0.422	0.699
Mar	0.235	0.0855	0.156	0.16	0.198	0.343	0.583		0.232	0.087	0.156	0.158	0.196	0.343	0.583
Apr	0.29	0.1357	0.156	0.164	0.227	0.54	0.54		0.278	0.1184	0.156	0.164	0.227	0.420	0.54
May	0.504	0.0713	0.218	0.405	0.54	0.54	0.54		0.486	0.0681	0.218	0.405	0.488	0.540	0.54
Jun	0.353	0.1309	0.156	0.18	0.335	0.54	0.54		0.338	0.1166	0.156	0.18	0.335	0.540	0.54
Jul	0.27	0.1186	0.156	0.16	0.236	0.492	0.645		0.252	0.0956	0.156	0.16	0.236	0.348	0.645
Aug	0.286	0.1746	0.156	0.16	0.21	0.507	0.971		0.272	0.1706	0.156	0.16	0.21	0.470	0.971
Sep	0.344	0.2165	0.156	0.162	0.265	0.683	0.972		0.337	0.2197	0.156	0.162	0.25	0.683	0.972
Oct	0.352	0.2081	0.156	0.164	0.278	0.624	0.971		0.348	0.2109	0.159	0.159	0.278	0.624	0.971
Nov	0.285	0.1933	0.156	0.159	0.213	0.474	0.92		0.28	0.1955	0.156	0.158	0.204	0.474	0.92
Dec	0.283	0.1806	0.156	0.16	0.216	0.448	0.94		0.279	0.1827	0.156	0.16	0.212	0.448	0.94

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.512	0.1905	0.213	0.299	0.476	0.79	0.998		0.518	0.183	0.317	0.317	0.476	0.790	0.998
Feb	0.545	0.1758	0.232	0.345	0.516	0.796	0.962		0.549	0.1706	0.35	0.35	0.516	0.796	0.962
Mar	0.477	0.1752	0.213	0.244	0.448	0.711	0.913		0.48	0.1708	0.254	0.254	0.448	0.711	0.913
Apr	0.363	0.1485	0.213	0.215	0.32	0.58	0.838		0.347	0.1345	0.213	0.215	0.32	0.580	0.838
May	0.536	0.0875	0.223	0.405	0.58	0.58	0.58		0.511	0.0836	0.223	0.405	0.512	0.580	0.58
Jun	0.375	0.1367	0.213	0.22	0.333	0.58	0.631		0.355	0.1192	0.213	0.22	0.333	0.580	0.631
Jul	0.346	0.1558	0.213	0.216	0.276	0.58	0.944		0.324	0.1461	0.213	0.216	0.276	0.564	0.944
Aug	0.45	0.2418	0.213	0.215	0.367	0.839	1		0.436	0.2472	0.213	0.215	0.345	0.839	1
Sep	0.571	0.26	0.213	0.23	0.566	0.957	1		0.567	0.2645	0.213	0.214	0.566	0.957	1
Oct	0.614	0.2327	0.214	0.299	0.614	0.934	1		0.62	0.224	0.299	0.3	0.614	0.934	1
Nov	0.507	0.2242	0.214	0.247	0.47	0.842	0.998		0.509	0.222	0.247	0.247	0.47	0.842	0.998
Dec	0.514	0.221	0.213	0.233	0.492	0.82	0.999		0.516	0.2189	0.236	0.236	0.492	0.820	0.999

Similkameen above Goodfellow Ck

mad 7.9
 lat 49.086
 long 120.665

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	2.47	4.40	1.54	0.3	84.2	745
Feb	2.08	1.56	1.62	0.26	16.6	620
Mar	2.51	1.70	2.02	0.4	10.9	683
Apr	7.32	6.58	5.06	1.11	58	652
May	25.78	15.96	21.7	3.11	90.8	578
Jun	28.78	18.05	24.75	5.09	106	545
Jul	11.64	11.58	7.15	1.65	78.9	677
Aug	3.21	2.59	2.33	0.91	15.8	688
Sep	1.75	0.81	1.59	0.62	6	561
Oct	1.93	1.40	1.53	0.58	16.3	687
Nov	4.01	7.48	2	0.43	97.8	695
Dec	3.12	5.72	1.55	0.44	103	729
PoR	7.9	12.51	2.56	0.26	106	7860
one_day_min	0.71	0.24	0.74	0.26	1.2	698
three_day_min	0.77	0.24	0.74	0.27	1.2	821
seven_day_min	0.84	0.24	0.78	0.28	1.3	939
thirty_day_min	1.01	0.27	1	0.53	1.5	1154
ninety_day_min	1.28	0.42	1.28	0.7	2.3	1471
one_day_max	71.96	20.73	75.3	37.4	106	150
three_day_max	62.73	17.63	65.7	32.93	102.7	223
seven_day_max	54.86	17.22	55.93	25.66	101.5	383
thirty_day_max	37.63	10.70	36.67	17.37	66	681
ninety_day_max	23.36	7.04	22.18	12.44	40.6	1376
julian_date_of_annual_minima	192.74	151.36	279	3	366	11
julian_date_of_annual_maxima	151	16.41	151	125	182	15
low_pulses	43.48	5.97	44	30	54	16
high_pulses	45	5.39	45	34	55	17
days_below_threshold	10.2	5.99	10	3	26	18
days_above_threshold	14.12	3.72	14	9	25	16
days_rising	131.16	10.32	131	107	153	15
days_falling	222.2	12.83	219	191	254	0
total days in period of record						9131
total years in period of record						25

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	2.14	3.34	1.54	0.3	73	0
	1.88	0.91	1.62	0.26	5.4	0
	2.25	1.03	2.02	0.4	4.1	0
	6.27	4.46	5.06	1.11	46.8	127
	19.72	12.35	14.8	3.11	79.6	34
	21.43	15.05	13.55	5.09	94.8	9
	9.55	8.14	7.15	1.65	67.7	6
	2.76	1.37	2.33	0.91	5.3	0
	1.68	0.63	1.59	0.62	2.8	0
	1.77	0.85	1.53	0.58	5.1	0
	3.27	5.61	2	0.43	86.6	0
	2.63	4.31	1.55	0.44	91.8	0
	6.29	9.49	2.56	0.26	94.8	176
	0.71	0.24	0.74	0.26	1.2	0
	0.77	0.24	0.74	0.27	1.2	0
	0.84	0.24	0.78	0.28	1.3	0
	1.01	0.27	1	0.53	1.5	0
	1.28	0.41	1.28	0.7	2.3	0
	60.76	20.73	64.1	26.2	94.8	1637
	51.53	17.63	54.5	21.73	91.5	1489
	43.78	17.03	44.73	17.02	90.3	1393
	27.94	9.37	26.74	14.03	54.8	1617
	17.76	5.17	16.64	10.46	30.9	2629
	192.74	151.36	279	3	366	13
	150.88	16.31	151	125	182	11
	37.6	5.59	37	27	52	17
	37.56	5.33	37	27	47	12
	10.2	5.99	10	3	26	23
	9.84	3.1	10	4	15	14
	117.52	13.45	119	83	148	9
	194.76	16.11	193	154	227	0
total days in period of record						9131
total years in period of record						25

fish species present	Black Bullhead	Northern Pikeminnow	Mottled Sculpin
	Bridgelip Sucker	Rainbow Trout	Mountain Whitefish
	Brook Trout	Redside Shiner	Northern Mountain Sucker
	Dolly Varden	Sculpin (General)	Torrent Sculpin
	Largescale Sucker	Slimy Sculpin	Umatilla Dace
	Longnose Dace	Sucker (General)	Whitefish (General)

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		377	775
Feb		371	706
Mar		494	775
Apr	509		750
May	774		775
Jun	750		750
Jul	690		775
Aug	247		775
Sep	48		750
Oct		369	775
Nov		481	750
Dec		382	775

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	377	74	377	41	3	22	775
Feb	371	45	371	25	0	7	706
Mar	494	75	494	47	0	20	775
Apr	704	424	704	338	6	248	750
May	775	765	775	755	223	741	775
Jun	750	750	750	746	248	725	750
Jul	775	596	775	490	63	345	775
Aug	614	141	614	87	0	49	775
Sep	381	9	381	1	0	0	750
Oct	369	35	369	17	0	8	775
Nov	481	140	481	109	10	74	750
Dec	382	123	382	81	5	57	775

summer winter total

Jan		377	775
Feb		371	706
Mar		494	775
Apr	509		750
May	774		775
Jun	750		750
Jul	690		775
Aug	247		775
Sep	0		750
Oct		369	775
Nov		481	750
Dec		382	775

juv.rear adult.rear overwint spawn chan.mair wet.link total

Jan	377	8	377	7	2	6	775
Feb	371	1	371	0	0	0	706
Mar	494	0	494	0	0	0	775
Apr	704	424	704	338	2	248	750
May	775	765	775	755	111	741	775
Jun	750	750	750	746	136	725	750
Jul	775	596	775	490	28	345	775
Aug	614	141	614	0	0	0	775
Sep	381	0	381	0	0	0	750
Oct	369	1	369	0	0	0	775
Nov	481	140	481	109	7	24	750
Dec	382	123	382	81	2	12	775

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.246	0.0922	0.155	0.159	0.218	0.383	0.668		0.237	0.0858	0.155	0.159	0.208	0.373	0.668
Feb	0.23	0.0894	0.155	0.158	0.207	0.329	0.711		0.224	0.0883	0.155	0.158	0.197	0.327	0.711
Mar	0.21	0.0595	0.155	0.157	0.191	0.288	0.576		0.201	0.0532	0.155	0.157	0.181	0.264	0.576
Apr	0.291	0.1475	0.155	0.158	0.225	0.527	0.668		0.27	0.1115	0.155	0.158	0.225	0.421	0.668
May	0.569	0.1271	0.157	0.379	0.638	0.668	0.668		0.527	0.1143	0.157	0.379	0.511	0.668	0.668
Jun	0.588	0.118	0.212	0.395	0.668	0.668	0.668		0.532	0.1125	0.212	0.395	0.48	0.668	0.668
Jul	0.349	0.1775	0.155	0.162	0.29	0.668	0.668		0.328	0.1508	0.155	0.162	0.29	0.559	0.668
Aug	0.208	0.0681	0.155	0.157	0.183	0.288	0.533		0.193	0.0345	0.155	0.157	0.183	0.233	0.315
Sep	0.22	0.0576	0.155	0.158	0.2	0.312	0.427		0.219	0.0587	0.155	0.155	0.199	0.312	0.427
Oct	0.231	0.0708	0.155	0.161	0.21	0.349	0.543		0.226	0.0699	0.155	0.161	0.207	0.344	0.451
Nov	0.253	0.1172	0.155	0.158	0.209	0.405	0.668		0.237	0.092	0.155	0.158	0.209	0.353	0.668
Dec	0.251	0.0932	0.155	0.165	0.229	0.351	0.668		0.24	0.0767	0.155	0.165	0.229	0.327	0.668

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.478	0.189	0.208	0.227	0.478	0.757	0.95		0.471	0.194	0.209	0.21	0.472	0.757	0.95
Feb	0.457	0.177	0.209	0.235	0.448	0.707	0.967		0.454	0.178	0.215	0.221	0.446	0.707	0.967
Mar	0.399	0.152	0.209	0.226	0.366	0.604	0.914		0.393	0.157	0.209	0.209	0.363	0.604	0.914
Apr	0.362	0.145	0.208	0.214	0.319	0.59	0.732		0.336	0.107	0.208	0.214	0.319	0.441	0.732
May	0.615	0.15	0.208	0.375	0.701	0.732	0.732		0.563	0.135	0.208	0.375	0.545	0.732	0.732
Jun	0.636	0.143	0.217	0.399	0.732	0.732	0.732		0.569	0.136	0.217	0.399	0.508	0.732	0.732
Jul	0.382	0.185	0.208	0.213	0.296	0.732	0.732		0.357	0.152	0.208	0.213	0.296	0.604	0.732
Aug	0.361	0.125	0.208	0.215	0.338	0.549	0.688		0.346	0.128	0.208	0.215	0.313	0.544	0.688
Sep	0.469	0.151	0.208	0.259	0.454	0.684	0.818		0.472	0.147	0.261	0.261	0.454	0.684	0.818
Oct	0.473	0.17	0.208	0.237	0.472	0.729	0.836		0.472	0.171	0.217	0.224	0.47	0.729	0.836
Nov	0.445	0.182	0.208	0.228	0.411	0.732	0.902		0.427	0.183	0.208	0.228	0.381	0.722	0.902
Dec	0.473	0.176	0.208	0.22	0.484	0.707	0.9		0.46	0.182	0.208	0.22	0.472	0.699	0.9

Similkameen near Princeton

mad 24.34
 lat 49.460
 long 120.502

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	6	6.26	4.8	0.14	150	1676
Feb	5.8	3.83	4.6	0.79	37	1369
Mar	6.6	4.47	5.2	1.16	31.1	1580
Apr	20.4	19.16	13.6	2.15	199	1478
May	86	60.53	70.8	3.99	377	1396
Jun	95.1	59.33	82.3	11.5	430	1237
Jul	33.6	30.05	23	2.44	328	1556
Aug	9	6.34	7.3	1.76	48.1	1579
Sep	5.6	3.12	4.7	1.51	31.7	1469
Oct	6.7	6.66	5	1.67	158	1669
Nov	9.4	15.10	5.5	0.42	227	1632
Dec	7.5	9.84	4.7	1.28	202	1677
PoR	24.3	41.11	7.2	0.14	430	18318
one_day_min	2.1	0.97	2	0.14	5.4	1963
three_day_min	2.3	0.94	2.1	0.58	5.5	2251
seven_day_min	2.5	0.92	2.3	0.85	6	2707
thirty_day_min	3.2	1.06	2.9	1.63	6.8	4407
ninety_day_min	3.9	1.40	3.5	1.87	9.6	4880
one_day_max	217.1	83.77	201	56.4	430	693
three_day_max	197.9	78.87	177.5	54.27	394.3	938
seven_day_max	175.1	70.01	155.1	49.74	342.6	1235
thirty_day_max	124.1	43.05	119.1	35.74	222.2	1723
ninety_day_max	75.1	26.10	69.6	30.18	131.8	3351
julian_date_of_annual_minima	203.4	151.16	271.3	1	366	28
julian_date_of_annual_maxima	148.6	13.43	147.5	120	174	39
low_pulses	43.4	10.11	43	23	71	39
high_pulses	45.3	9.76	46	26	73	39
days_below_threshold	10.1	7.99	8	0	30	35
days_above_threshold	13.8	4.22	13.5	7	26	36
days_rising	132.4	15.05	132.5	90	164	44
days_falling	204.4	23.52	208.5	129	246	0
total days in period of record						21184
total years in period of record						58

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	5.3	3.96	4.8	0.14	117.7	1
	5.4	2.75	4.6	0.79	11	0
	6	2.7	5.2	1.16	11.6	0
	17.7	13.43	13.6	2.15	166.7	0
	67.7	50.36	46.2	3.99	344.7	10
	73.3	50.5	50	11.5	397.7	0
	28.1	21.11	23	2.44	295.7	0
	8	3.66	7.3	1.76	15.8	0
	5.3	2.22	4.7	1.51	9.8	0
	5.9	4.16	5	1.67	125.7	0
	7.7	10.46	5.5	0.42	194.7	0
	6.5	6.44	4.7	1.28	169.7	0
	19.8	32.47	7.2	0.14	397.7	11
	2.1	0.97	2	0.14	5.4	0
	2.3	0.94	2.1	0.58	5.5	0
	2.5	0.92	2.3	0.85	6	0
	3.2	1.06	2.9	1.63	6.8	0
	3.9	1.35	3.5	1.87	9.1	0
	185.2	83.07	168.7	46.2	397.7	6018
	166	78.17	145.2	45.9	362	6858
	143.4	68.98	122.8	40.14	310.3	8332
	95.7	38.6	88.5	33.23	189.9	9175
	58.8	20	52.3	29.26	103.5	3239
	203.4	151.16	271.3	1	366	27
	148.6	13.42	147.5	121	174	34
	38.3	9.13	37.5	21	65	29
	38.9	8.62	38.5	19	63	27
	10.1	7.99	8	0	30	42
	10.3	3.14	10	5	19	34
	119.8	15.06	122	76	152	34
	179.7	24.41	184	116	221	0
total days in period of record						21184
total years in period of record						58

fish species present	Black Bullhead	Mottled Sculpin	Sculpin (General)
	Bridgelip Sucker	Mountain Whitefish	Slimy Sculpin
	Brook Trout	Northern Mountain Sucker	Sucker (General)
	Dolly Varden	Northern Pikeminnow	Torrent Sculpin
	Largescale Sucker	Rainbow Trout	Umatilla Dace
	Longnose Dace	Redside Shiner	Whitefish (General)

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		874	1798
Feb		735	1638
Mar		992	1798
Apr	1078		1740
May	1785		1798
Jun	1740		1740
Jul	1582		1798
Aug	564		1798
Sep	178		1740
Oct		924	1798
Nov		1036	1740
Dec		846	1798

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	874	103	874	130	2	19	1798
Feb	735	63	735	137	0	3	1638
Mar	992	160	992	189	0	20	1798
Apr	1556	884	1556	981	15	519	1740
May	1796	1768	1796	1782	644	1652	1798
Jun	1740	1738	1740	1739	692	1677	1740
Jul	1791	1386	1791	1477	80	857	1798
Aug	1363	268	1363	364	0	65	1798
Sep	807	40	807	74	0	5	1740
Oct	924	128	924	173	1	33	1798
Nov	1036	219	1036	273	10	107	1740
Dec	846	212	846	272	3	74	1798

summer winter total

Jan		874	1798
Feb		735	1638
Mar		992	1798
Apr	1078		1740
May	1785		1798
Jun	1740		1740
Jul	1582		1798
Aug	564		1798
Sep	178		1740
Oct		924	1798
Nov		1036	1740
Dec		846	1798

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	874	5	874	5	1	4	1798
Feb	735	0	735	0	0	0	1638
Mar	992	0	992	0	0	0	1798
Apr	1556	884	1556	981	4	519	1740
May	1796	1768	1796	1782	343	1652	1798
Jun	1740	1738	1740	1739	402	1677	1740
Jul	1791	1386	1791	1477	33	857	1798
Aug	1363	268	1363	364	0	0	1798
Sep	807	0	807	0	0	0	1740
Oct	924	5	924	7	1	3	1798
Nov	1036	219	1036	273	5	28	1740
Dec	846	212	846	272	1	11	1798

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.206	0.0772	0.149	0.15	0.177	0.304	0.944		0.196	0.0642	0.149	0.15	0.177	0.274	0.944
Feb	0.2	0.063	0.149	0.151	0.182	0.262	0.605		0.194	0.0543	0.149	0.151	0.182	0.241	0.605
Mar	0.191	0.0589	0.149	0.15	0.17	0.258	0.51		0.18	0.0329	0.149	0.15	0.17	0.223	0.475
Apr	0.332	0.1884	0.149	0.152	0.259	0.638	0.765		0.316	0.1607	0.149	0.152	0.259	0.552	0.765
May	0.667	0.1397	0.153	0.458	0.758	0.765	0.765		0.641	0.1314	0.153	0.458	0.636	0.765	0.765
Jun	0.698	0.1101	0.22	0.514	0.765	0.765	0.765		0.662	0.1062	0.22	0.514	0.66	0.765	0.765
Jul	0.441	0.1988	0.149	0.185	0.41	0.765	0.765		0.422	0.1746	0.149	0.185	0.41	0.598	0.765
Aug	0.208	0.0817	0.149	0.151	0.18	0.307	0.649		0.193	0.0415	0.149	0.151	0.18	0.270	0.346
Sep	0.186	0.0409	0.149	0.15	0.173	0.236	0.516		0.181	0.0316	0.149	0.15	0.173	0.227	0.391
Oct	0.198	0.0686	0.149	0.15	0.177	0.265	0.765		0.187	0.0406	0.149	0.15	0.177	0.235	0.765
Nov	0.226	0.1187	0.149	0.15	0.186	0.353	0.792		0.21	0.086	0.149	0.15	0.186	0.279	0.792
Dec	0.223	0.0937	0.149	0.152	0.194	0.323	0.765		0.211	0.0641	0.149	0.152	0.194	0.276	0.765

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.375	0.1477	0.209	0.221	0.329	0.6	0.998		0.366	0.1504	0.209	0.211	0.316	0.598	0.998
Feb	0.365	0.1317	0.209	0.22	0.336	0.542	0.924		0.359	0.1347	0.209	0.22	0.328	0.538	0.924
Mar	0.33	0.0976	0.209	0.218	0.315	0.459	0.841		0.319	0.0994	0.209	0.218	0.295	0.451	0.841
Apr	0.396	0.1868	0.209	0.219	0.316	0.712	0.848		0.377	0.1531	0.209	0.219	0.316	0.606	0.848
May	0.737	0.1616	0.209	0.483	0.84	0.848	0.848		0.708	0.1521	0.209	0.483	0.71	0.848	0.848
Jun	0.771	0.129	0.228	0.556	0.848	0.848	0.848		0.733	0.1239	0.228	0.556	0.736	0.848	0.848
Jul	0.481	0.2203	0.209	0.222	0.424	0.848	0.848		0.459	0.1922	0.209	0.222	0.424	0.662	0.848
Aug	0.3	0.099	0.209	0.211	0.266	0.448	0.724		0.284	0.0815	0.209	0.211	0.266	0.404	0.705
Sep	0.347	0.1081	0.209	0.217	0.324	0.51	0.758		0.343	0.1104	0.209	0.212	0.322	0.509	0.758
Oct	0.349	0.1186	0.209	0.216	0.32	0.533	0.848		0.337	0.1171	0.209	0.216	0.308	0.524	0.848
Nov	0.364	0.1559	0.209	0.215	0.31	0.591	0.983		0.345	0.1434	0.209	0.215	0.283	0.555	0.983
Dec	0.385	0.1469	0.209	0.222	0.352	0.608	0.848		0.371	0.142	0.209	0.222	0.328	0.596	0.848

Big Sheep

mad 5.74
 lat 49.017
 long 117.944

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.09	0.96	0.76	0.24	10.2	1439
Feb	1.23	1.14	0.9	0.24	16	1292
Mar	3.22	3.47	2	0.29	27.3	1382
Apr	13.59	9.92	11.1	0.77	74.2	1213
May	27.22	11.85	25.5	4.85	72.5	1057
Jun	13.73	9.12	11.4	1.39	58.6	1106
Jul	3.43	2.71	2.55	0.67	18.7	1371
Aug	1.08	0.91	0.82	0.33	12.3	1458
Sep	0.79	0.65	0.59	0.24	7.34	1404
Oct	0.84	0.70	0.6	0.23	5.22	1410
Nov	1.27	1.21	0.77	0.2	10.3	1283
Dec	1.29	1.16	0.79	0.23	10.3	1355
PoR	5.75	9.60	1.3	0.2	74.2	15770
one_day_min	0.43	0.14	0.4	0.2	0.84	3500
three_day_min	0.45	0.15	0.4	0.23	0.87	3790
seven_day_min	0.46	0.15	0.43	0.24	0.88	3897
thirty_day_min	0.5	0.15	0.45	0.27	0.95	4261
ninety_day_min	0.59	0.23	0.54	0.29	1.47	4178
one_day_max	48.7	11.89	48.7	25.3	74.2	397
three_day_max	45.1	10.79	44.6	22.67	69.7	489
seven_day_max	40.39	9.71	38.91	18.66	60.86	712
thirty_day_max	30.09	7.22	31.73	13.83	44.78	1290
ninety_day_max	18.71	4.59	19.3	8.36	26.89	2584
julian_date_of_annual_minima	206.71	140.11	264	1	366	24
julian_date_of_annual_maxima	135.52	11.54	135	110	166	38
low_pulses	35.75	10.37	35	17	55	30
high_pulses	38.27	9.01	38	21	56	29
days_below_threshold	10.94	9.95	9	0	42	36
days_above_threshold	10.98	3.33	11	4	20	40
days_rising	120.47	15.80	119	87	150	33
days_falling	205.75	22.83	211	163	242	0
total days in period of record						18628
total years in period of record						51

fish species present Brook Trout
 Rainbow Trout
 Kokanee

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	0.94	0.51	0.76	0.24	1.91	0
	1.07	0.62	0.9	0.24	7.11	0
	2.74	2.23	2	0.29	18.41	0
	11.36	7.12	11.1	0.77	65.31	48
	21.48	9.11	16.7	4.85	63.61	26
	11.39	6.14	11.4	1.39	49.71	349
	3	1.66	2.55	0.67	9.81	564
	0.96	0.41	0.82	0.33	3.41	496
	0.68	0.27	0.59	0.24	1.23	251
	0.74	0.4	0.6	0.23	1.7	268
	1.15	0.86	0.77	0.2	2.9	60
	1.17	0.81	0.79	0.23	2.72	3
	4.73	7.42	1.27	0.2	65.31	2065
	0.43	0.14	0.4	0.2	0.84	0
	0.45	0.15	0.4	0.23	0.87	0
	0.46	0.15	0.43	0.24	0.88	0
	0.5	0.15	0.45	0.27	0.95	0
	0.59	0.22	0.54	0.29	1.33	0
	39.82	11.88	39.81	16.7	65.31	2798
	36.32	10.58	35.71	16.7	60.81	2721
	31.77	9.23	30.02	16.06	51.97	2246
	23.13	5.44	23.45	13.17	36.19	1983
	15.04	3.16	15.26	8.14	21.28	2754
	206.71	140.11	264	1	366	30
	135.56	11.42	135	110	166	36
	31.51	10.6	30	14	52	15
	33.41	9.36	32	17	53	12
	10.94	9.95	9	0	42	31
	7.63	2.39	8	3	13	12
	106.63	18.22	102	77	143	16
	175.9	23.21	176	121	223	0
total days in period of record						18628
total years in period of record						51

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		486	1581
Feb		552	1441
Mar		1069	1581
Apr	1479		1530
May	1581		1581
Jun	1518		1530
Jul	890		1581
Aug	90		1581
Sep	53		1530
Oct		238	1581
Nov		487	1530
Dec		556	1581

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	486	74	486	28	0	8	1581
Feb	552	91	552	22	0	15	1441
Mar	1069	524	1069	345	3	275	1581
Apr	1510	1446	1510	1327	217	1242	1530
May	1581	1581	1581	1581	927	1576	1581
Jun	1530	1471	1530	1339	237	1224	1530
Jul	1395	615	1395	347	0	237	1581
Aug	428	38	428	15	0	11	1581
Sep	187	25	187	10	0	4	1530
Oct	238	35	238	1	0	0	1581
Nov	487	125	487	28	0	15	1530
Dec	556	112	556	29	0	12	1581

	summer	winter	total
Jan		486	1581
Feb		552	1441
Mar		1069	1581
Apr	1479		1530
May	1581		1581
Jun	1518		1530
Jul	890		1581
Aug	2		1581
Sep	0		1530
Oct		238	1581
Nov		487	1530
Dec		556	1581

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	486	0	486	0	0	0	1581
Feb	552	2	552	1	0	1	1441
Mar	1069	524	1069	345	0	275	1581
Apr	1510	1446	1510	1327	98	1242	1530
May	1581	1581	1581	1581	497	1576	1581
Jun	1530	1471	1530	1339	87	1224	1530
Jul	1395	615	1395	347	0	10	1581
Aug	428	1	428	0	0	0	1581
Sep	187	0	187	0	0	0	1530
Oct	238	0	238	0	0	0	1581
Nov	487	0	487	0	0	0	1530
Dec	556	0	556	0	0	0	1581

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.321	0.1251	0.15	0.164	0.314	0.489	0.673		0.318	0.1284	0.153	0.153	0.313	0.489	0.673
Feb	0.302	0.1235	0.15	0.161	0.274	0.482	0.676		0.297	0.1266	0.15	0.151	0.269	0.479	0.676
Mar	0.272	0.1168	0.15	0.153	0.23	0.443	0.635		0.256	0.0941	0.15	0.153	0.23	0.375	0.635
Apr	0.463	0.1524	0.15	0.221	0.486	0.635	0.635		0.446	0.137	0.15	0.221	0.486	0.635	0.635
May	0.614	0.0559	0.247	0.557	0.635	0.635	0.635		0.61	0.0549	0.247	0.557	0.624	0.635	0.635
Jun	0.466	0.1584	0.15	0.219	0.495	0.635	0.635		0.45	0.1439	0.15	0.219	0.495	0.635	0.635
Jul	0.224	0.0902	0.15	0.152	0.19	0.338	0.635		0.207	0.0537	0.15	0.152	0.19	0.285	0.449
Aug	0.293	0.0957	0.15	0.165	0.29	0.431	0.572		0.291	0.0961	0.153	0.159	0.289	0.428	0.572
Sep	0.372	0.1144	0.15	0.207	0.384	0.516	0.679		0.375	0.1095	0.203	0.203	0.384	0.516	0.679
Oct	0.367	0.1192	0.15	0.178	0.379	0.514	0.689		0.367	0.1198	0.161	0.161	0.379	0.514	0.689
Nov	0.321	0.1274	0.15	0.16	0.317	0.492	0.731		0.316	0.131	0.15	0.16	0.31	0.492	0.731
Dec	0.312	0.1292	0.15	0.153	0.3	0.49	0.69		0.307	0.1328	0.15	0.153	0.299	0.490	0.69

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.606	0.207	0.213	0.294	0.653	0.847	0.95		0.61	0.2003	0.292	0.292	0.653	0.847	0.95
Feb	0.571	0.21	0.213	0.261	0.582	0.839	0.951		0.573	0.2063	0.217	0.259	0.582	0.839	0.951
Mar	0.437	0.193	0.213	0.221	0.402	0.726	0.926		0.418	0.1911	0.213	0.221	0.327	0.726	0.926
Apr	0.517	0.172	0.213	0.248	0.542	0.716	0.716		0.496	0.1535	0.213	0.248	0.542	0.716	0.716
May	0.69	0.069	0.253	0.626	0.716	0.716	0.716		0.687	0.0678	0.253	0.626	0.703	0.716	0.716
Jun	0.516	0.183	0.213	0.239	0.547	0.716	0.716		0.497	0.1662	0.213	0.239	0.547	0.716	0.716
Jul	0.334	0.123	0.213	0.218	0.287	0.532	0.716		0.314	0.1107	0.213	0.218	0.286	0.499	0.701
Aug	0.583	0.171	0.213	0.316	0.617	0.794	0.902		0.588	0.1613	0.214	0.316	0.617	0.794	0.902
Sep	0.694	0.171	0.214	0.447	0.746	0.866	0.952		0.708	0.1401	0.447	0.448	0.746	0.866	0.952
Oct	0.682	0.189	0.213	0.328	0.74	0.864	0.956		0.69	0.1715	0.328	0.328	0.74	0.864	0.956
Nov	0.589	0.229	0.213	0.226	0.649	0.848	0.969		0.587	0.2314	0.221	0.221	0.649	0.848	0.969
Dec	0.574	0.231	0.213	0.234	0.633	0.847	0.957		0.573	0.2323	0.226	0.226	0.633	0.847	0.957

Moyie

mad 19.7
 lat 49
 long 116.179

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	4.7	3.92	3.7	0.85	55.5	1992
Feb	5.2	4.91	3.9	1.25	90.3	1810
Mar	8.3	7.2	5.6	1.42	59.2	1945
Apr	37.3	29.13	29.3	2.04	173	1630
May	88.6	39.9	81.6	11.8	253	1533
Jun	55.4	35.01	48.7	6.14	207	1454
Jul	13.4	10.68	9.8	2.1	80.1	1863
Aug	3.9	2.16	3.3	1.22	20.3	1707
Sep	2.8	1.82	2.4	0.91	20.6	1961
Oct	4.1	5.24	2.6	0.85	77	2043
Nov	6.5	7.31	3.9	0.93	99.4	1894
Dec	6.2	7.31	4	0.99	87.8	2036
PoR	19.7	31.82	5.2	0.85	253	21868
one_day_min	1.7	0.55	1.6	0.85	3.4	3745
three_day_min	1.7	0.56	1.6	0.85	3.5	3891
seven_day_min	1.8	0.58	1.7	0.85	3.5	4135
thirty_day_min	2.1	0.68	2	0.99	4.6	5034
ninety_day_min	2.6	0.97	2.5	1.25	6.4	5694
one_day_max	145.3	45.63	144	40.2	253	1053
three_day_max	139	44.02	138	38.13	244.7	1190
seven_day_max	129.2	41.14	127.7	37.41	232.3	1405
thirty_day_max	99.5	29.71	99.4	33.37	160.1	2198
ninety_day_max	62.3	18.47	64.9	21.38	104.3	4070
julian_date_of_annual_minima	218.7	120.55	259	1	365	46
julian_date_of_annual_maxima	141	26.52	138	108	340	67
low_pulses	28.5	6.1	28	17	46	45
high_pulses	33	5.38	33	22	46	51
days_below_threshold	6.2	5.07	5	0	21	48
days_above_threshold	9.8	3.12	10	3	19	48
days_rising	109.3	11.39	110	86	133	46
days_falling	206.5	17.88	209	166	241	0
total days in period of record						25933
total years in period of record						71

fish species present suckers lake chub rainbow
 brook trout largemouth bass sculpin
 brown bullhead longnose dace
 bull trout mountain whitefish
 cutthroat pumpkinseed
 kokanee

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	4.1	2.05	3.7	0.85	26.9	0
	4.5	2.78	3.9	1.25	61.7	0
	7.3	4.29	5.6	1.42	30.6	0
	30.8	20.06	29.3	2.04	144.4	2
	70.5	31.08	55.2	11.8	224.4	0
	44.9	24.56	48	6.14	178.4	1
	11.8	6.9	9.8	2.1	51.5	0
	3.7	1.57	3.3	1.22	6.6	0
	2.6	0.98	2.4	0.91	4.4	0
	3.3	2.51	2.6	0.85	48.4	0
	5.6	4.47	3.9	0.93	70.8	0
	5.1	3.83	4	0.99	59.2	0
	16.2	24.58	5.1	0.85	224.4	3
	1.7	0.55	1.6	0.85	3.4	0
	1.7	0.56	1.6	0.85	3.5	0
	1.8	0.58	1.7	0.85	3.5	0
	2.1	0.66	2	0.99	4.2	0
	2.6	0.88	2.5	1.25	5.3	0
	117.8	43.73	115.4	40.2	224.4	5048
	111.9	41.55	109.4	38.13	216.1	5433
	102.7	37.67	99.1	37.41	203.7	6470
	77.2	23.09	73.5	33.37	131.5	8653
	49.9	13.02	49.7	21.38	81.7	7347
	218.7	120.55	259	1	365	52
	137.6	11.28	138	108	166	53
	24.3	6.16	24	13	43	4
	28	5.89	28	15	44	4
	6.2	5.07	5	0	21	61
	7.1	2.53	7	2	13	15
	97.3	13.37	97	68	125	4
	174.7	21.01	175	121	213	0
total days in period of record						25933
total years in period of record						71

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		1040	2201
Feb		985	2006
Mar		1685	2201
Apr	1976		2130
May	2201		2201
Jun	2112		2130
Jul	1354		2201
Aug	132		2201
Sep	42		2130
Oct		625	2201
Nov		1037	2130
Dec		1122	2201

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwinte	spawn	chan.mair	wet.link	total
Jan	1040	118	1040	132	0	29	2201
Feb	985	169	985	190	1	26	2006
Mar	1685	501	1685	557	0	168	2201
Apr	2101	1813	2101	1854	210	1389	2130
May	2201	2201	2201	2201	1156	2196	2201
Jun	2130	2060	2130	2078	492	1819	2130
Jul	2027	994	2027	1057	1	463	2201
Aug	799	25	799	35	0	1	2201
Sep	305	25	305	28	0	1	2130
Oct	625	124	625	137	0	40	2201
Nov	1037	374	1037	401	1	93	2130
Dec	1122	257	1122	274	1	95	2201

summer winter total

Jan		1040	2201
Feb		985	2006
Mar		1685	2201
Apr	1976		2130
May	2201		2201
Jun	2112		2130
Jul	1354		2201
Aug	0		2201
Sep	0		2130
Oct		625	2201
Nov		1037	2130
Dec		1122	2201

	juv.rear	adult.rear	overwinte	spawn	chan.mair	wet.link	total
Jan	1040	1	1040	2	0	1	2201
Feb	985	5	985	5	0	4	2006
Mar	1685	501	1685	557	0	8	2201
Apr	2101	1813	2101	1854	62	1389	2130
May	2201	2201	2201	2201	617	2196	2201
Jun	2130	2060	2130	2078	201	1819	2130
Jul	2027	994	2027	1057	0	463	2201
Aug	799	0	799	0	0	0	2201
Sep	305	0	305	0	0	0	2130
Oct	625	8	625	8	0	5	2201
Nov	1037	374	1037	401	0	10	2130
Dec	1122	257	1122	274	0	15	2201

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.279	0.0834	0.208	0.211	0.247	0.394	0.807	0.279	0.0834	0.208	0.211	0.247	0.394	0.807
Feb	0.274	0.0786	0.208	0.211	0.24	0.383	0.823	0.274	0.0786	0.208	0.211	0.24	0.383	0.823
Mar	0.294	0.1094	0.208	0.211	0.25	0.445	0.823	0.294	0.1094	0.208	0.211	0.25	0.445	0.823
Apr	0.586	0.2014	0.208	0.279	0.619	0.823	0.823	0.586	0.2014	0.208	0.279	0.619	0.823	0.823
May	0.802	0.0531	0.338	0.744	0.823	0.823	0.823	0.802	0.0531	0.338	0.744	0.823	0.823	0.823
Jun	0.694	0.1632	0.219	0.415	0.776	0.823	0.823	0.694	0.1632	0.219	0.415	0.776	0.823	0.823
Jul	0.357	0.1543	0.208	0.213	0.297	0.596	0.823	0.357	0.1543	0.208	0.213	0.297	0.596	0.823
Aug	0.272	0.0676	0.208	0.211	0.246	0.388	0.498	0.272	0.0676	0.208	0.211	0.246	0.388	0.498
Sep	0.321	0.0875	0.208	0.217	0.304	0.445	0.606	0.321	0.0875	0.208	0.217	0.304	0.445	0.606
Oct	0.316	0.096	0.208	0.214	0.298	0.445	0.823	0.316	0.096	0.208	0.214	0.298	0.445	0.823
Nov	0.305	0.1064	0.208	0.212	0.27	0.455	0.823	0.305	0.1064	0.208	0.212	0.27	0.455	0.823
Dec	0.295	0.105	0.208	0.212	0.255	0.426	0.823	0.295	0.105	0.208	0.212	0.255	0.426	0.823

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.45	0.1542	0.265	0.276	0.417	0.684	0.907	0.45	0.1542	0.265	0.276	0.417	0.684	0.907
Feb	0.435	0.1386	0.265	0.281	0.406	0.658	0.899	0.435	0.1386	0.265	0.281	0.406	0.658	0.899
Mar	0.393	0.128	0.265	0.272	0.344	0.59	0.899	0.393	0.128	0.265	0.272	0.344	0.590	0.899
Apr	0.641	0.2212	0.265	0.304	0.684	0.899	0.899	0.641	0.2212	0.265	0.304	0.684	0.899	0.899
May	0.877	0.0567	0.333	0.82	0.899	0.899	0.899	0.877	0.0567	0.333	0.82	0.899	0.899	0.899
Jun	0.757	0.1862	0.265	0.423	0.855	0.899	0.899	0.757	0.1862	0.265	0.423	0.855	0.899	0.899
Jul	0.412	0.1561	0.265	0.271	0.349	0.653	0.899	0.412	0.1561	0.265	0.271	0.349	0.653	0.899
Aug	0.462	0.1487	0.265	0.279	0.443	0.702	0.821	0.462	0.1487	0.265	0.279	0.443	0.702	0.821
Sep	0.568	0.1532	0.266	0.355	0.568	0.761	0.894	0.568	0.1532	0.266	0.355	0.568	0.761	0.894
Oct	0.534	0.1633	0.265	0.313	0.537	0.747	0.907	0.534	0.1633	0.265	0.313	0.537	0.747	0.907
Nov	0.464	0.1541	0.265	0.291	0.436	0.691	0.899	0.464	0.1541	0.265	0.291	0.436	0.691	0.899
Dec	0.452	0.1609	0.265	0.272	0.407	0.695	0.899	0.452	0.1609	0.265	0.272	0.407	0.695	0.899

Greata

mad 0.088
 lat 49.794
 long 119.851

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.027	0.0113	0.025	8.00E-03	0.057	570
Feb	0.027	0.0105	0.025	9.00E-03	0.056	543
Mar	0.032	0.0119	0.031	1.30E-02	0.072	630
Apr	0.085	0.0904	0.06	1.60E-02	1.08	831
May	0.403	0.4007	0.24	3.00E-02	2.48	812
Jun	0.218	0.21	0.156	1.60E-02	1.68	793
Jul	0.086	0.0627	0.074	3.00E-03	0.392	658
Aug	0.045	0.0389	0.035	1.00E-03	0.246	741
Sep	0.033	0.0241	0.028	0.00E+00	0.159	674
Oct	0.031	0.0156	0.027	6.00E-03	0.091	670
Nov	0.032	0.0151	0.028	1.00E-02	0.113	595
Dec	0.029	0.0124	0.026	9.00E-03	0.062	559
PoR	0.088	0.1745	0.037	0.00E+00	2.48	8076
one_day_min	0.015	0.0096	0.012	0.00E+00	0.04	3164
three_day_min	0.016	0.01	0.013	0.00E+00	0.04	3529
seven_day_min	0.017	0.0101	0.013	4.30E-04	0.041	3611
thirty_day_min	0.018	0.0099	0.015	2.20E-03	0.042	3685
ninety_day_min	0.021	0.0099	0.017	5.80E-03	0.045	3398
one_day_max	0.694	0.5988	0.662	5.70E-02	2.48	2037
three_day_max	0.656	0.5716	0.641	4.90E-02	2.38	2261
seven_day_max	0.589	0.5113	0.563	4.70E-02	2.076	2443
thirty_day_max	0.443	0.3806	0.371	4.20E-02	1.617	2965
ninety_day_max	0.251	0.1958	0.207	3.40E-02	0.792	3838
julian_date_of_annual_minima	162.621	123.2501	228	2.50E+00	366	20
julian_date_of_annual_maxima	137.233	10.903	137.5	1.10E+02	164	20
low_pulses	34.467	10.0575	34.5	1.70E+01	60	23
high_pulses	38.133	10.4312	38.5	1.50E+01	59	20
days_below_threshold	6.7	6.869	6	0.00E+00	20	10
days_above_threshold	10.833	6.103	10	0.00E+00	24	19
days_rising	110.6	16.4707	111	8.30E+01	138	18
days_falling	153.667	17.7226	155.5	1.20E+02	191	1
total days in period of record						10958
total years in period of record						30

fish species present brook trout
 rainbow

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
2.60E-02	0.0103	0.025	8.00E-03	0.042	0	
2.60E-02	0.0094	0.025	9.00E-03	0.042	0	
3.10E-02	0.0098	0.031	1.30E-02	0.046	0	
7.40E-02	0.071	0.06	1.60E-02	0.992	417	
3.44E-01	0.38	0.152	3.00E-02	2.392	35	
1.82E-01	0.182	0.147	1.60E-02	1.592	60	
7.50E-02	0.0431	0.074	3.00E-03	0.304	422	
4.10E-02	0.0289	0.035	1.00E-03	0.158	312	
3.10E-02	0.0188	0.028	0.00E+00	0.071	186	
2.90E-02	0.0129	0.027	6.00E-03	0.051	0	
3.10E-02	0.0126	0.028	1.00E-02	0.05	0	
2.80E-02	0.0111	0.026	9.00E-03	0.045	0	
7.70E-02	0.1553	0.037	0.00E+00	2.392	1432	
1.50E-02	0.0096	0.012	0.00E+00	0.04	2795	
1.60E-02	0.01	0.013	0.00E+00	0.04	2424	
1.70E-02	0.0101	0.013	4.30E-04	0.041	2322	
1.80E-02	0.0099	0.015	2.20E-03	0.042	2021	
2.10E-02	0.0095	0.017	5.80E-03	0.042	1741	
6.18E-01	0.5866	0.574	5.70E-02	2.392	0	
5.81E-01	0.5589	0.552	4.90E-02	2.292	0	
5.16E-01	0.4968	0.475	4.70E-02	1.988	0	
3.80E-01	0.3595	0.285	4.20E-02	1.529	0	
2.12E-01	0.1702	0.17	3.40E-02	0.711	0	
1.63E+02	123.2501	228	2.50E+00	366	25	
1.40E+02	10.7975	138	1.20E+02	165	23	
2.93E+01	9.5806	32.5	9.00E+00	46	11	
3.21E+01	11.1087	34	1.00E+01	47	14	
6.70E+00	6.869	6	0.00E+00	20	16	
7.13E+00	3.9193	8	0.00E+00	16	8	
9.70E+01	18.8743	102.5	5.50E+01	130	2	
1.30E+02	21.3738	136	7.40E+01	157	0	
total days in period of record					10958	
total years in period of record					30	

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		651	930
Feb		669	848
Mar		824	930
Apr	778		900
May	916		930
Jun	845		900
Jul	701		930
Aug	461		930
Sep	314		900
Oct		746	930
Nov		734	900
Dec		710	930

	summer	winter	total
Jan		651	930
Feb		669	848
Mar		824	930
Apr	778		900
May	916		930
Jun	845		900
Jul	701		930
Aug	461		930
Sep	314		900
Oct		746	930
Nov		734	900
Dec		710	930

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwinte	spawn	chan.mair	wet.link	total
Jan	651	43	651	0	0	0	930
Feb	669	43	669	0	0	0	848
Mar	824	94	824	0	0	0	930
Apr	895	619	895	24	22	217	900
May	930	877	930	399	391	805	930
Jun	898	795	898	158	149	636	900
Jul	852	626	852	3	2	380	930
Aug	682	312	682	0	0	133	930
Sep	644	166	644	0	0	39	900
Oct	746	118	746	0	0	4	930
Nov	734	119	734	0	0	5	900
Dec	710	64	710	0	0	0	930

	juv.rear	adult.rear	overwinte	spawn	chan.mair	wet.link	total
Jan	651	0	651	0	0	0	930
Feb	669	0	669	0	0	0	848
Mar	824	0	824	0	0	0	930
Apr	895	619	895	17	15	217	900
May	930	877	930	344	325	805	930
Jun	898	795	898	107	104	636	900
Jul	852	626	852	0	0	380	930
Aug	682	312	682	0	0	133	930
Sep	644	166	644	0	0	0	900
Oct	746	118	746	0	0	0	930
Nov	734	119	734	0	0	0	900
Dec	710	0	710	0	0	0	930

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	na	na	na	na	na	na	na
Feb	na	na	na	na	na	na	na
Mar	na	na	na	na	na	na	na
Apr	na	na	na	na	na	na	na
May	na	na	na	na	na	na	na
Jun	na	na	na	na	na	na	na
Jul	na	na	na	na	na	na	na
Aug	na	na	na	na	na	na	na
Sep	na	na	na	na	na	na	na
Oct	na	na	na	na	na	na	na
Nov	na	na	na	na	na	na	na
Dec	na	na	na	na	na	na	na

	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	na	na	na	na	na	na	na
Feb	na	na	na	na	na	na	na
Mar	na	na	na	na	na	na	na
Apr	na	na	na	na	na	na	na
May	na	na	na	na	na	na	na
Jun	na	na	na	na	na	na	na
Jul	na	na	na	na	na	na	na
Aug	na	na	na	na	na	na	na
Sep	na	na	na	na	na	na	na
Oct	na	na	na	na	na	na	na
Nov	na	na	na	na	na	na	na
Dec	na	na	na	na	na	na	na

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	na	na	na	na	na	na	na
Feb	na	na	na	na	na	na	na
Mar	na	na	na	na	na	na	na
Apr	na	na	na	na	na	na	na
May	na	na	na	na	na	na	na
Jun	na	na	na	na	na	na	na
Jul	na	na	na	na	na	na	na
Aug	na	na	na	na	na	na	na
Sep	na	na	na	na	na	na	na
Oct	na	na	na	na	na	na	na
Nov	na	na	na	na	na	na	na
Dec	na	na	na	na	na	na	na

	mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	na	na	na	na	na	na	na
Feb	na	na	na	na	na	na	na
Mar	na	na	na	na	na	na	na
Apr	na	na	na	na	na	na	na
May	na	na	na	na	na	na	na
Jun	na	na	na	na	na	na	na
Jul	na	na	na	na	na	na	na
Aug	na	na	na	na	na	na	na
Sep	na	na	na	na	na	na	na
Oct	na	na	na	na	na	na	na
Nov	na	na	na	na	na	na	na
Dec	na	na	na	na	na	na	na

Vaseux

mad 0.953
 lat 49.249
 long 119.321

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.131	0.06	0.11	0.038	0.4	613
Feb	0.118	0.05	0.105	0.033	0.28	596
Mar	0.157	0.10	0.13	0.042	0.9	824
Apr	0.965	1.18	0.416	0.062	7.97	773
May	4.519	3.34	3.47	0.326	21.5	745
Jun	3.365	2.81	2.625	0.194	17.3	729
Jul	0.988	1.01	0.682	0.079	10.5	829
Aug	0.326	0.37	0.219	0.048	3.95	845
Sep	0.233	0.20	0.168	0.045	1.89	800
Oct	0.228	0.21	0.173	0.059	2.57	862
Nov	0.208	0.14	0.17	0.05	1.09	774
Dec	0.156	0.08	0.13	0.045	0.59	743
PoR	0.953	1.94	0.205	0.033	21.5	9133
one_day_min	0.078	0.03	0.071	0.033	0.17	2550
three_day_min	0.081	0.04	0.076	0.034	0.18	2651
seven_day_min	0.086	0.04	0.084	0.039	0.18	2858
thirty_day_min	0.098	0.04	0.087	0.049	0.19	3134
ninety_day_min	0.113	0.04	0.103	0.062	0.21	2821
one_day_max	11.638	5.16	11.2	3.88	21.5	285
three_day_max	9.916	4.36	9.768	3.107	19.3	379
seven_day_max	8.493	3.85	8.799	2.694	17.63	537
thirty_day_max	5.762	2.44	5.366	1.921	10.85	873
ninety_day_max	3.195	1.21	3.2	1.064	5.4	1744
julian_date_of_annual_minima	149.517	145.23	55.75	1	365	20
julian_date_of_annual_maxima	141.3	12.89	143	112	167	20
low_pulses	41.767	6.90	41.5	28	57	21
high_pulses	43.367	6.28	43	29	56	20
days_below_threshold	8.633	7.70	8.5	0	27	20
days_above_threshold	13.933	4.41	14	6	22	17
days_rising	132.367	12.51	130	111	162	20
days_falling	200.5	19.60	199	156	234	0
total days in period of record						10958
total years in period of record						30

fish species present Bridgelip Sucker
 Longnose Dace
 Mountain Whitefish
 Rainbow Trout
 Prickly Sculpin
 Sockeye

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	0.127	0.051	0.11	0.038	0.21	613
	0.116	0.045	0.105	0.033	0.2	596
	0.144	0.062	0.13	0.042	0.26	922
	0.843	0.921	0.416	0.062	6.82	852
	3.754	3.053	2.32	0.326	20.35	799
	2.789	2.451	2.07	0.194	16.15	769
	0.848	0.75	0.682	0.079	9.35	890
	0.277	0.224	0.219	0.048	2.8	921
	0.205	0.117	0.168	0.045	0.74	893
	0.194	0.098	0.173	0.059	1.42	925
	0.189	0.093	0.17	0.05	0.36	774
	0.147	0.059	0.13	0.045	0.25	743
	0.806	1.654	0.204	0.033	20.35	9697
	0.078	0.033	0.071	0.033	0.17	2550
	0.081	0.035	0.076	0.034	0.18	2651
	0.086	0.036	0.084	0.039	0.18	2858
	0.098	0.04	0.087	0.049	0.19	3156
	0.112	0.042	0.103	0.062	0.21	2850
	10.488	5.158	10.05	2.73	20.35	221
	8.773	4.352	8.618	2.153	18.15	276
	7.383	3.797	7.649	2.102	16.48	376
	4.79	2.249	4.261	1.669	9.7	699
	2.652	1.003	2.59	0.967	4.67	1483
	149.517	145.232	55.75	1	365	20
	141.183	13.068	143	112	167	20
	36.033	6.36	36	23	48	17
	37.1	7.024	36	23	53	9
	8.633	7.699	8.5	0	27	20
	10.9	2.987	11	6	16	18
	121.167	16.597	124.5	85	157	15
	174.733	19.162	176	123	210	0
total days in period of record						10958
total years in period of record						30

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		186	930
Feb		93	848
Mar		226	930
Apr	479		900
May	927		930
Jun	882		900
Jul	670		930
Aug	235		930
Sep	130		900
Oct		430	930
Nov		378	900
Dec		249	930

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	186	0	186	0	0	0	930
Feb	93	0	93	0	0	0	848
Mar	226	10	226	0	0	0	930
Apr	708	400	708	196	27	297	900
May	930	920	930	836	421	899	930
Jun	900	857	900	673	265	764	900
Jul	835	556	835	183	19	338	930
Aug	533	137	533	12	2	48	930
Sep	381	62	381	2	0	13	900
Oct	430	59	430	5	0	17	930
Nov	378	38	378	0	0	3	900
Dec	249	1	249	0	0	0	930

summer winter total

Jan		186	930
Feb		93	848
Mar		226	930
Apr	479		900
May	927		930
Jun	882		900
Jul	670		930
Aug	235		930
Sep	130		900
Oct		430	930
Nov		378	900
Dec		249	930

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	186	0	186	0	0	0	930
Feb	93	0	93	0	0	0	848
Mar	226	0	226	0	0	0	930
Apr	708	400	708	196	14	297	900
May	930	920	930	836	289	899	930
Jun	900	857	900	673	168	764	900
Jul	835	556	835	56	8	338	930
Aug	533	137	533	5	0	7	930
Sep	381	2	381	0	0	0	900
Oct	430	3	430	0	0	1	930
Nov	378	0	378	0	0	0	900
Dec	249	0	249	0	0	0	930

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.524	0.1402	0.191	0.339	0.553	0.713	0.843		0.528	0.1335	0.339	0.339	0.553	0.713	0.843
Feb	0.553	0.1281	0.262	0.347	0.57	0.713	0.871		0.555	0.1243	0.347	0.347	0.57	0.713	0.871
Mar	0.486	0.1511	0.152	0.282	0.494	0.675	0.822		0.493	0.1379	0.287	0.287	0.494	0.675	0.822
Apr	0.318	0.1375	0.151	0.164	0.3	0.516	0.726		0.309	0.1343	0.151	0.164	0.3	0.516	0.726
May	0.385	0.0756	0.152	0.246	0.43	0.43	0.43		0.362	0.0741	0.152	0.246	0.363	0.430	0.43
Jun	0.342	0.1038	0.151	0.166	0.403	0.43	0.43		0.321	0.0937	0.151	0.166	0.33	0.430	0.43
Jul	0.256	0.1094	0.151	0.155	0.216	0.43	0.656		0.241	0.1015	0.151	0.155	0.216	0.406	0.656
Aug	0.367	0.1722	0.151	0.162	0.331	0.628	0.791		0.363	0.175	0.152	0.155	0.33	0.628	0.791
Sep	0.411	0.1676	0.151	0.182	0.409	0.631	0.806		0.413	0.1655	0.152	0.182	0.409	0.631	0.806
Oct	0.409	0.1535	0.151	0.215	0.4	0.621	0.74		0.413	0.1478	0.152	0.22	0.4	0.621	0.74
Nov	0.418	0.1585	0.151	0.199	0.406	0.638	0.781		0.422	0.1526	0.205	0.205	0.406	0.638	0.781
Dec	0.478	0.1438	0.153	0.293	0.494	0.645	0.806		0.484	0.1331	0.295	0.295	0.494	0.645	0.806

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.855	0.1035	0.439	0.713	0.896	0.967	0.992		0.861	0.09	0.713	0.713	0.896	0.967	0.992
Feb	0.879	0.0842	0.587	0.723	0.905	0.967	0.995		0.882	0.0776	0.723	0.723	0.905	0.967	0.995
Mar	0.817	0.1469	0.221	0.625	0.863	0.954	0.989		0.833	0.1086	0.633	0.633	0.863	0.954	0.989
Apr	0.511	0.2372	0.206	0.221	0.438	0.877	0.97		0.5	0.2433	0.206	0.221	0.438	0.877	0.97
May	0.394	0.072	0.206	0.262	0.438	0.438	0.527		0.368	0.073	0.206	0.262	0.372	0.438	0.527
Jun	0.369	0.0893	0.206	0.224	0.421	0.438	0.741		0.345	0.0833	0.206	0.224	0.322	0.438	0.741
Jul	0.404	0.2006	0.206	0.215	0.337	0.751	0.946		0.389	0.2072	0.206	0.215	0.299	0.751	0.946
Aug	0.656	0.2328	0.206	0.293	0.699	0.932	0.985		0.663	0.2203	0.209	0.318	0.699	0.932	0.985
Sep	0.727	0.2047	0.206	0.399	0.793	0.934	0.987		0.739	0.1812	0.251	0.417	0.793	0.934	0.987
Oct	0.734	0.1869	0.206	0.487	0.784	0.929	0.974		0.752	0.1507	0.228	0.511	0.784	0.929	0.974
Nov	0.746	0.184	0.206	0.46	0.79	0.937	0.983		0.759	0.156	0.479	0.479	0.79	0.937	0.983
Dec	0.816	0.1336	0.308	0.645	0.863	0.941	0.987		0.828	0.105	0.649	0.649	0.863	0.941	0.987

Lingfield

mad 0.78
 lat 51.674
 long 124.142

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.119	0.102	0.085	0.023	0.58	681
Feb	0.087	0.048	0.065	0.03	0.37	595
Mar	0.096	0.078	0.07	0.038	0.588	723
Apr	0.396	0.576	0.18	0.042	4.47	676
May	3.121	2.432	2.585	0.15	15.7	560
Jun	3.272	2.236	2.68	0.493	14	614
Jul	1.217	1.072	0.863	0.074	7.02	691
Aug	0.353	0.519	0.219	0.034	4.67	762
Sep	0.145	0.114	0.113	0.025	1.11	673
Oct	0.211	0.419	0.13	0.02	7.31	778
Nov	0.183	0.269	0.13	0.019	3.48	748
Dec	0.125	0.096	0.105	0.019	0.69	708
PoR	0.78	1.531	0.15	0.019	15.7	8209
one_day_min	0.046	0.017	0.045	0.019	0.094	1502
three_day_min	0.048	0.017	0.047	0.019	0.095	1611
seven_day_min	0.049	0.018	0.048	0.019	0.099	1719
thirty_day_min	0.056	0.02	0.053	0.02	0.113	1870
ninety_day_min	0.074	0.034	0.062	0.039	0.184	2297
one_day_max	8.273	2.951	7.955	4.43	15.7	248
three_day_max	7.577	2.737	6.97	4.037	14.4	295
seven_day_max	6.696	2.503	6.186	3.646	13.353	386
thirty_day_max	4.487	1.454	4.039	2.456	7.949	700
ninety_day_max	2.612	0.927	2.34	1.572	5.414	1558
julian_date_of_annual_minima	192.442	137.004	247.5	2.5	366	15
julian_date_of_annual_maxima	149.423	12.669	150	129	176	16
low_pulses	34.538	5.961	33.5	22	48	19
high_pulses	36.731	6.391	36	25	49	17
days_below_threshold	5	4.907	4	0	15	13
days_above_threshold	12.962	3.28	12.5	8	19	17
days_rising	122.577	16.132	120.5	84	153	16
days_falling	200.077	28.477	208	123	249	0
total days in period of record						9497
total years in period of record						26

fish species present bull trout
 chinook
 coho
 rainbow
 steelhead

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	0.107	0.068	0.085	0.023	0.255	351
	0.083	0.037	0.065	0.03	0.156	336
	0.085	0.037	0.07	0.038	0.163	599
	0.317	0.373	0.18	0.042	3.52	668
	2.46	2.185	1.635	0.15	14.75	611
	2.631	1.996	1.73	0.493	13.05	727
	1.026	0.774	0.863	0.074	6.07	731
	0.299	0.362	0.219	0.034	3.72	764
	0.129	0.066	0.113	0.025	0.255	740
	0.181	0.324	0.13	0.02	6.36	705
	0.156	0.162	0.13	0.019	2.53	662
	0.111	0.052	0.105	0.019	0.21	583
	0.634	1.269	0.15	0.019	14.75	7477
	0.046	0.017	0.045	0.019	0.094	3320
	0.048	0.017	0.047	0.019	0.095	3379
	0.049	0.018	0.048	0.019	0.099	3442
	0.056	0.02	0.053	0.02	0.113	3284
	0.072	0.029	0.062	0.039	0.152	2462
	7.323	2.951	7.005	3.48	14.75	94
	6.628	2.737	6.02	3.087	13.45	135
	5.746	2.502	5.236	2.696	12.403	209
	3.589	1.418	3.115	1.823	7	345
	2.089	0.793	1.747	1.274	4.606	640
	192.442	137.004	247.5	2.5	366	16
	149.423	12.669	150	129	176	18
	30.115	6.421	29.5	16	44	7
	31.423	6.871	32	17	45	3
	5	4.907	4	0	15	19
	10.077	2.869	9.5	5	15	13
	112.154	19.534	116	76	144	11
	174.846	31.405	188	109	212	0
total days in period of record						9497
total years in period of record						26

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		147	806
Feb		76	735
Mar		83	806
Apr	253		780
May	778		806
Jun	780		780
Jul	739		806
Aug	242		806
Sep	61		780
Oct		290	806
Nov		291	780
Dec		160	806

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	147	27	147	0	0	0	806
Feb	76	0	76	0	0	0	735
Mar	83	16	83	0	0	0	806
Apr	415	180	415	62	5	105	780
May	805	749	805	618	310	673	806
Jun	780	780	780	655	315	751	780
Jul	795	672	795	229	65	457	806
Aug	553	150	553	24	11	63	806
Sep	222	23	222	0	0	2	780
Oct	290	56	290	9	3	20	806
Nov	291	34	291	10	2	15	780
Dec	160	28	160	0	0	0	806

	summer	winter	total
Jan		147	806
Feb		76	735
Mar		83	806
Apr	253		780
May	778		806
Jun	780		780
Jul	739		806
Aug	242		806
Sep	0		780
Oct		290	806
Nov		291	780
Dec		160	806

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	147	0	147	0	0	0	806
Feb	76	0	76	0	0	0	735
Mar	83	0	83	0	0	0	806
Apr	415	180	415	17	1	105	780
May	805	749	805	463	205	673	806
Jun	780	780	780	655	205	751	780
Jul	795	672	795	106	31	457	806
Aug	553	150	553	16	4	20	806
Sep	222	0	222	0	0	0	780
Oct	290	9	290	5	2	7	806
Nov	291	10	291	3	0	6	780
Dec	160	0	160	0	0	0	806

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.651	0.1864	0.205	0.327	0.688	0.856	0.949		0.658	0.1708	0.33	0.33	0.688	0.856	0.949
Feb	0.706	0.142	0.249	0.483	0.766	0.83	0.921		0.714	0.1262	0.483	0.483	0.766	0.830	0.921
Mar	0.693	0.1526	0.204	0.455	0.744	0.842	0.887		0.706	0.1246	0.469	0.469	0.744	0.842	0.887
Apr	0.5	0.2184	0.202	0.222	0.464	0.794	0.869		0.488	0.2283	0.202	0.22	0.442	0.794	0.869
May	0.403	0.0972	0.202	0.22	0.471	0.471	0.495		0.364	0.0983	0.202	0.22	0.368	0.471	0.495
Jun	0.416	0.0833	0.202	0.267	0.471	0.471	0.471		0.385	0.0822	0.202	0.267	0.376	0.471	0.471
Jul	0.294	0.0974	0.202	0.205	0.254	0.471	0.729		0.278	0.0844	0.202	0.205	0.254	0.443	0.729
Aug	0.42	0.175	0.202	0.218	0.393	0.677	0.905		0.417	0.1769	0.203	0.21	0.39	0.677	0.905
Sep	0.58	0.1787	0.202	0.32	0.597	0.803	0.941		0.588	0.1648	0.33	0.33	0.597	0.803	0.941
Oct	0.539	0.1882	0.203	0.263	0.546	0.813	0.961		0.541	0.1837	0.203	0.264	0.546	0.813	0.961
Nov	0.552	0.1827	0.202	0.315	0.546	0.804	0.965		0.557	0.1752	0.204	0.318	0.546	0.804	0.965
Dec	0.62	0.1707	0.203	0.383	0.623	0.825	0.965		0.63	0.1525	0.39	0.39	0.623	0.825	0.965

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.908	0.1361	0.381	0.701	0.963	0.994	1		0.923	0.0954	0.705	0.705	0.963	0.994	1
Feb	0.95	0.0633	0.555	0.866	0.981	0.991	0.999		0.958	0.0437	0.866	0.866	0.981	0.991	0.999
Mar	0.939	0.0983	0.377	0.843	0.976	0.992	0.997		0.956	0.0443	0.856	0.856	0.976	0.992	0.997
Apr	0.74	0.2519	0.264	0.325	0.825	0.985	0.995		0.736	0.2576	0.264	0.284	0.825	0.985	0.995
May	0.417	0.0836	0.264	0.298	0.433	0.447	0.875		0.382	0.1014	0.264	0.269	0.406	0.447	0.875
Jun	0.389	0.0621	0.264	0.275	0.433	0.433	0.441		0.358	0.0668	0.264	0.275	0.349	0.433	0.441
Jul	0.394	0.1364	0.264	0.269	0.359	0.592	0.973		0.381	0.1412	0.264	0.269	0.326	0.592	0.973
Aug	0.717	0.209	0.264	0.386	0.761	0.96	0.998		0.727	0.1922	0.264	0.416	0.761	0.960	0.998
Sep	0.878	0.1384	0.264	0.69	0.93	0.987	1		0.895	0.0934	0.705	0.705	0.93	0.987	1
Oct	0.838	0.1724	0.265	0.562	0.905	0.988	1		0.851	0.1416	0.264	0.586	0.905	0.988	1
Nov	0.854	0.1504	0.266	0.666	0.905	0.987	1		0.869	0.1184	0.266	0.687	0.905	0.987	1
Dec	0.904	0.1198	0.327	0.767	0.94	0.99	1		0.921	0.069	0.774	0.774	0.94	0.990	1

Browns

mad 5.66
 lat 49.693
 long 125.085

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	7.24	10.588	3.36	0.38	88.9	415
Feb	5.64	7.476	3.11	0.485	66.5	394
Mar	5.49	7.019	3.25	0.614	74.9	429
Apr	7.81	6.863	6.15	1.39	52.4	401
May	10.35	6.139	9.66	1.29	50.6	337
Jun	6.78	6.611	4.42	0.222	43.1	390
Jul	2.28	4.176	0.943	0.088	24	423
Aug	1.12	3.632	0.245	0.023	54.5	444
Sep	0.74	2.808	0.255	0.05	36.2	438
Oct	6.04	12.74	1.15	0.062	183	422
Nov	8	11.378	4.1	0.191	104	411
Dec	6.45	9.347	3.26	0.56	101	418
PoR	5.66	8.45	2.75	0.023	183	4922
one_day_min	0.1	0.058	0.09	0.023	0.2	370
three_day_min	0.12	0.064	0.092	0.027	0.21	417
seven_day_min	0.13	0.069	0.101	0.039	0.25	434
thirty_day_min	0.23	0.196	0.165	0.072	0.8	604
ninety_day_min	0.78	0.719	0.465	0.124	2.5	634
one_day_max	72.01	37.325	66.5	33.1	183	74
three_day_max	43.66	15.395	45	25.133	77.6	85
seven_day_max	29.42	8.185	28.673	19.471	47.64	124
thirty_day_max	16.16	2.72	16.378	12.292	21.12	397
ninety_day_max	11.26	1.976	11.493	8.467	16.11	776
julian_date_of_annual_minima	259	24.368	266	215	301	11
julian_date_of_annual_maxima	191.8	126.069	161	17	363	9
low_pulses	51.33	7.068	52	37	61	8
high_pulses	52.27	7.196	53	39	64	8
days_below_threshold	10	5.581	9	1	19	9
days_above_threshold	21.2	5.784	19	15	31	10
days_rising	118.6	10.756	115	98	142	12
days_falling	241.07	13.274	245	209	267	0
total days in period of record						5480
total years in period of record						15

fish species present chum
 coho
 cutthroat

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	5.35	8.075	3.36	0.38	79.84	0
	4.25	5.437	3.11	0.485	57.44	0
	4.12	5.002	3.25	0.614	65.84	0
	5.36	4.428	5.6	1.39	43.34	42
	5.73	3.423	4.906	1.29	41.54	407
	4.6	3.841	4.42	0.222	34.04	392
	1.5	2.013	0.943	0.088	14.94	365
	0.79	2.643	0.245	0.023	45.44	343
	0.52	1.848	0.255	0.05	27.14	312
	4.93	10.795	1.15	0.062	173.94	164
	5.93	9.017	4.1	0.191	94.94	4
	4.83	7.116	3.26	0.56	91.94	0
	3.99	6.261	2.65	0.023	173.94	2029
	0.1	0.058	0.09	0.023	0.2	216
	0.12	0.064	0.092	0.027	0.21	222
	0.13	0.069	0.101	0.039	0.25	214
	0.22	0.174	0.165	0.072	0.7	192
	0.59	0.421	0.455	0.124	1.52	15
	62.95	37.325	57.44	24.04	173.94	366
	34.88	15.099	36.539	16.239	68.54	930
	21.63	7.838	21.62	11.159	38.58	1640
	10.52	3.001	9.514	6.964	16.24	2565
	7.52	1.401	7.656	5.129	9.9	2076
	259	24.368	266	215	301	14
	200.83	128.641	280	17	363	1
	41.07	6.408	43	31	54	10
	39.4	6.599	40	25	49	10
	10	5.581	9	1	19	13
	14	5.182	12	7	24	10
	97	7.559	96	81	112	0
	206.53	18.589	211	159	239	0
total days in period of record						5480
total years in period of record						15

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		405	465
Feb		394	425
Mar		453	465
Apr	391		450
May	444		465
Jun	326		450
Jul	84		465
Aug	51		465
Sep	15		450
Oct		233	465
Nov		406	450
Dec		426	465

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	405	248	405	171	33	148	465
Feb	394	212	394	150	13	125	425
Mar	453	248	453	154	16	118	465
Apr	450	334	450	275	17	241	450
May	465	428	465	381	18	350	465
Jun	395	287	395	218	16	186	450
Jul	198	61	198	42	1	41	465
Aug	82	37	82	22	2	16	465
Sep	39	12	39	10	2	8	450
Oct	233	172	233	144	32	130	465
Nov	406	260	406	204	32	186	450
Dec	426	239	426	173	23	148	465

summer winter total

Jan		405	465
Feb		394	425
Mar		453	465
Apr	391		450
May	444		465
Jun	326		450
Jul	84		465
Aug	51		465
Sep	6		450
Oct		233	465
Nov		406	450
Dec		426	465

juv.rear adult.rear overwint spawn chan.mair wet.link total

Jan	405	248	405	171	17	61	465
Feb	394	212	394	150	8	28	425
Mar	453	248	453	154	6	31	465
Apr	450	334	450	275	6	48	450
May	465	428	465	381	1	92	465
Jun	395	287	395	218	2	186	450
Jul	198	27	198	24	0	21	465
Aug	82	4	82	4	2	4	465
Sep	6	5	6	4	2	4	450
Oct	233	172	233	144	15	130	465
Nov	406	260	406	204	20	186	450
Dec	426	239	426	173	14	49	465

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.372	0.177	0.203	0.206	0.293	0.712	0.712	0.332	0.142	0.203	0.206	0.293	0.573	0.712	
Feb	0.333	0.151	0.203	0.206	0.264	0.575	0.712	0.293	0.105	0.203	0.206	0.264	0.341	0.712	
Mar	0.318	0.149	0.203	0.206	0.254	0.572	0.712	0.277	0.1	0.203	0.206	0.254	0.304	0.712	
Apr	0.401	0.172	0.203	0.206	0.382	0.684	0.712	0.325	0.111	0.203	0.206	0.355	0.390	0.712	
May	0.498	0.165	0.203	0.245	0.527	0.712	0.712	0.346	0.107	0.203	0.245	0.318	0.514	0.712	
Jun	0.4	0.174	0.203	0.209	0.348	0.701	0.776	0.337	0.12	0.203	0.209	0.348	0.480	0.776	
Jul	0.448	0.209	0.203	0.212	0.413	0.755	0.943	0.423	0.207	0.203	0.208	0.371	0.755	0.943	
Aug	0.664	0.245	0.203	0.261	0.749	0.94	0.989	0.653	0.26	0.203	0.206	0.749	0.940	0.989	
Sep	0.698	0.23	0.203	0.344	0.739	0.959	0.981	0.7	0.224	0.207	0.328	0.739	0.959	0.981	
Oct	0.572	0.244	0.203	0.229	0.613	0.906	0.973	0.561	0.24	0.203	0.229	0.578	0.906	0.973	
Nov	0.39	0.18	0.203	0.207	0.327	0.712	0.813	0.342	0.138	0.203	0.207	0.327	0.516	0.813	
Dec	0.35	0.165	0.203	0.206	0.276	0.678	0.712	0.31	0.121	0.203	0.206	0.276	0.421	0.712	

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.478	0.19	0.27	0.274	0.42	0.724	0.935	0.434	0.1862	0.27	0.274	0.328	0.724	0.935	
Feb	0.433	0.15	0.27	0.274	0.39	0.689	0.891	0.39	0.1417	0.27	0.274	0.305	0.627	0.891	
Mar	0.401	0.138	0.27	0.274	0.341	0.61	0.833	0.36	0.1214	0.27	0.274	0.295	0.554	0.833	
Apr	0.429	0.141	0.27	0.277	0.386	0.69	0.724	0.345	0.0944	0.27	0.277	0.314	0.444	0.724	
May	0.5	0.157	0.27	0.282	0.506	0.724	0.724	0.339	0.1057	0.27	0.282	0.291	0.500	0.724	
Jun	0.484	0.182	0.27	0.275	0.457	0.724	0.984	0.413	0.1727	0.27	0.275	0.317	0.717	0.984	
Jul	0.695	0.227	0.27	0.36	0.724	0.98	0.999	0.677	0.2394	0.27	0.31	0.684	0.980	0.999	
Aug	0.852	0.224	0.27	0.431	0.979	0.999	1	0.851	0.2242	0.314	0.353	0.979	0.999	1	
Sep	0.901	0.157	0.274	0.682	0.976	0.999	1	0.915	0.1228	0.275	0.663	0.976	0.999	1	
Oct	0.705	0.262	0.27	0.301	0.724	0.998	1	0.693	0.2653	0.27	0.301	0.724	0.998	1	
Nov	0.478	0.175	0.27	0.277	0.443	0.724	0.989	0.425	0.1647	0.27	0.277	0.333	0.724	0.989	
Dec	0.454	0.161	0.27	0.276	0.412	0.724	0.858	0.411	0.1495	0.27	0.276	0.328	0.684	0.858	

Pallant

mad 8.08
 lat 53.058
 long 132.05

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	11.02	9	8.36	1.08	63.8	676
Feb	9.65	7.01	8.09	1.31	46.9	573
Mar	7.52	4.76	6.2	1.53	36.4	651
Apr	8.27	4.91	6.92	1.91	37.4	608
May	5.83	3.63	5	1.35	26.8	614
Jun	3.96	2.74	3.21	0.66	25.4	635
Jul	2.28	1.94	1.71	0.26	18.7	692
Aug	2.33	3.04	1.25	0.21	25.1	731
Sep	5	5.42	3.29	0.12	46.6	690
Oct	13.13	9.82	10.6	0.81	93.4	654
Nov	14.16	9.08	12.4	0.82	67.7	606
Dec	13.91	9.2	12	1.51	73.7	609
PoR	8.08	7.7	5.67	0.12	93.4	7739
one_day_min	0.74	0.51	0.59	0.12	2.4	843
three_day_min	0.77	0.52	0.61	0.12	2.5	846
seven_day_min	0.83	0.54	0.7	0.13	2.6	857
thirty_day_min	1.2	0.76	0.97	0.18	3.4	1020
ninety_day_min	2.19	1.09	2.12	0.37	5.1	1284
one_day_max	49.45	14.51	45.1	32.8	93.4	106
three_day_max	40.15	11.3	38.13	26.4	70.3	170
seven_day_max	31.75	7	31.04	20.7	47.9	235
thirty_day_max	20.34	3.61	19.65	14.73	28.9	625
ninety_day_max	15.82	2.8	15.82	11.42	22	1132
julian_date_of_annual_minima	227.96	19.82	230	186	262	18
julian_date_of_annual_maxima	250.48	125.2	302.5	11	355	19
low_pulses	57.08	5	57.5	44	69	20
high_pulses	57.54	4.77	57.5	45	70	22
days_below_threshold	12.08	5.1	12.5	2	22	20
days_above_threshold	21.85	5.86	22	8	32	16
days_rising	106.31	6.56	106	93	119	16
days_falling	255.23	7.89	255.5	242	269	0
total days in period of record						9496
total years in period of record						26

fish species present chum
 coho
 cutthroat
 Dolly Varden
 lamprey
 pink
 rainbow
 sockeye
 steelhead

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	7.23	5.14	7.44	1.08	51.2	0
	6.65	3.64	7.68	1.31	34.3	0
	5.76	2.1	6.2	1.53	23.8	0
	6.17	1.97	6.92	1.91	24.8	8
	4.72	1.74	5	1.35	14.2	802
	3.44	1.62	3.21	0.66	12.8	777
	2.03	1.23	1.71	0.26	6.1	464
	1.9	1.65	1.25	0.21	12.5	217
	3.91	3.14	3.29	0.12	34	42
	8.16	6.07	7.3	0.81	80.8	0
	8.41	5.61	7.3	0.82	55.1	0
	8.11	5.5	6.69	1.51	61.1	0
	5.53	4.34	5.41	0.12	80.8	2310
	0.74	0.51	0.59	0.12	2.4	0
	0.77	0.52	0.61	0.12	2.5	0
	0.83	0.54	0.7	0.13	2.6	0
	1.2	0.76	0.97	0.18	3.4	0
	2.09	0.95	2.03	0.37	4.2	0
	36.85	14.51	32.5	20.2	80.8	3577
	27.56	11.29	25.53	13.8	57.7	4357
	19.59	6.7	18.79	10.97	35.3	5262
	11.62	2.43	11.47	7.98	17.7	5859
	9.3	1.33	8.94	7.64	12.9	2402
	227.96	19.82	230	186	262	26
	251.06	125.8	302.5	11	363	0
	40.46	6.03	40	29	51	19
	38	5.89	39	25	46	16
	12.08	5.1	12.5	2	22	22
	11.27	3.42	12	4	16	16
	80.65	8.78	79.5	67	99	0
	185.27	25.54	188	141	225	0
total days in period of record						9496
total years in period of record						26

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		800	806
Feb		723	734
Mar		804	806
Apr	722		780
May	598		806
Jun	388		780
Jul	173		806
Aug	160		806
Sep	397		780
Oct		794	806
Nov		772	780
Dec		803	806

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	800	606	800	522	27	410	806
Feb	723	551	723	475	9	368	734
Mar	804	575	804	437	3	268	806
Apr	780	621	780	484	1	321	780
May	788	478	788	318	0	162	806
Jun	661	277	661	133	0	53	780
Jul	427	83	427	41	0	13	806
Aug	328	101	328	68	0	40	806
Sep	583	283	583	218	3	156	780
Oct	794	694	794	615	40	510	806
Nov	772	718	772	678	29	587	780
Dec	803	733	803	667	42	560	806

	summer	winter	total
Jan		800	806
Feb		723	734
Mar		804	806
Apr	722		780
May	598		806
Jun	388		780
Jul	173		806
Aug	160		806
Sep	397		780
Oct		794	806
Nov		772	780
Dec		803	806

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	800	606	800	522	6	100	806
Feb	723	551	723	475	3	49	734
Mar	804	575	804	437	0	17	806
Apr	780	621	780	484	0	25	780
May	788	478	788	318	0	4	806
Jun	661	277	661	4	0	2	780
Jul	427	1	427	1	0	0	806
Aug	328	101	328	4	0	4	806
Sep	583	283	583	218	2	18	780
Oct	794	694	794	615	5	138	806
Nov	772	718	772	678	9	131	780
Dec	803	733	803	667	8	142	806

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.402	0.1705	0.208	0.212	0.365	0.694	0.708		0.319	0.1059	0.208	0.212	0.33	0.426	0.708
Feb	0.383	0.1506	0.208	0.212	0.354	0.605	0.708		0.309	0.0809	0.208	0.212	0.339	0.339	0.708
Mar	0.328	0.1233	0.208	0.21	0.284	0.517	0.708		0.278	0.0571	0.208	0.21	0.284	0.321	0.702
Apr	0.348	0.1291	0.208	0.215	0.312	0.549	0.708		0.29	0.0563	0.208	0.215	0.312	0.328	0.708
May	0.291	0.095	0.208	0.21	0.257	0.423	0.708		0.256	0.0361	0.208	0.21	0.257	0.292	0.528
Jun	0.271	0.0749	0.208	0.21	0.247	0.374	0.708		0.254	0.0549	0.208	0.21	0.247	0.308	0.552
Jul	0.343	0.1471	0.208	0.21	0.285	0.562	0.83		0.335	0.1493	0.208	0.21	0.27	0.561	0.83
Aug	0.419	0.1885	0.208	0.214	0.378	0.697	0.876		0.406	0.1914	0.208	0.214	0.348	0.696	0.876
Sep	0.353	0.1713	0.208	0.21	0.289	0.616	0.95		0.324	0.1553	0.208	0.21	0.289	0.512	0.95
Oct	0.447	0.1699	0.208	0.223	0.433	0.708	0.708		0.339	0.1123	0.208	0.223	0.325	0.510	0.708
Nov	0.48	0.154	0.208	0.256	0.485	0.708	0.708		0.347	0.1006	0.208	0.256	0.325	0.485	0.708
Dec	0.467	0.1641	0.208	0.232	0.474	0.708	0.708		0.333	0.1145	0.208	0.232	0.301	0.511	0.708

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.427	0.1437	0.265	0.272	0.385	0.689	0.792		0.343	0.1106	0.265	0.272	0.286	0.522	0.792
Feb	0.407	0.1284	0.265	0.273	0.371	0.62	0.725		0.333	0.0981	0.265	0.273	0.29	0.474	0.725
Mar	0.354	0.0992	0.265	0.269	0.315	0.498	0.699		0.31	0.0684	0.265	0.269	0.281	0.392	0.693
Apr	0.356	0.1037	0.265	0.269	0.313	0.515	0.699		0.301	0.0557	0.265	0.269	0.284	0.355	0.699
May	0.367	0.1122	0.265	0.269	0.317	0.553	0.713		0.341	0.1104	0.265	0.269	0.278	0.525	0.713
Jun	0.439	0.1691	0.265	0.27	0.385	0.691	0.913		0.431	0.1726	0.265	0.27	0.375	0.688	0.913
Jul	0.616	0.2263	0.265	0.298	0.625	0.918	0.993		0.617	0.2239	0.265	0.306	0.625	0.918	0.993
Aug	0.685	0.2428	0.265	0.309	0.742	0.971	0.996		0.678	0.2513	0.271	0.281	0.742	0.971	0.996
Sep	0.507	0.222	0.265	0.277	0.428	0.878	0.999		0.481	0.2325	0.265	0.277	0.378	0.878	0.999
Oct	0.445	0.1542	0.265	0.274	0.399	0.699	0.87		0.336	0.1166	0.265	0.274	0.283	0.516	0.87
Nov	0.461	0.1479	0.265	0.28	0.438	0.699	0.869		0.328	0.1085	0.265	0.28	0.283	0.499	0.869
Dec	0.45	0.1501	0.265	0.274	0.421	0.699	0.699		0.323	0.1091	0.265	0.273	0.273	0.480	0.699

Sleese

mad 10.1
 lat 49.063
 long 121.699

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	7.5	7.18	5.5	1.35	63.4	985
Feb	7.5	6.54	5.4	1.1	62	879
Mar	6.6	5.65	4.9	1.42	87.9	975
Apr	8.7	5.77	7.3	1.56	70	868
May	17.6	9.17	15.3	1.59	59.5	809
Jun	21.2	9.05	18.7	6.31	70.8	801
Jul	14.7	7.61	12.7	4.64	68.9	821
Aug	7	4.19	5.8	1.42	33.8	901
Sep	5	3.79	4	1.08	47.6	953
Oct	6.9	6.93	4.7	0.63	70.7	969
Nov	9.6	10.01	6.8	0.97	117	963
Dec	8.7	8.92	6	1.43	113	983
PoR	10.1	8.75	7.1	0.63	117	10907
one_day_min	2	0.58	2	0.63	3.5	716
three_day_min	2	0.59	2	0.69	3.6	752
seven_day_min	2.2	0.63	2.2	0.9	3.7	837
thirty_day_min	2.8	0.77	2.8	1.08	4.9	1052
ninety_day_min	4.4	1.13	4.3	2.03	6.2	1528
one_day_max	58.6	20.58	55.7	28.4	117	181
three_day_max	45.6	13.56	41.8	25.23	80.3	294
seven_day_max	36.1	8.65	34.4	21.4	53.5	447
thirty_day_max	25	6.73	23.9	16.36	41.7	1357
ninety_day_max	18.9	4.4	18.5	12.45	29.8	1847
julian_date_of_annual_minima	203.9	125.54	268	1	366	19
julian_date_of_annual_maxima	177.1	86.3	157	15	363	26
low_pulses	51.4	3.7	51	41	57	28
high_pulses	53.1	2.82	53	47	57	18
days_below_threshold	12	5.78	11	1	25	22
days_above_threshold	18.4	5.17	18	9	28	22
days_rising	121.8	7.99	123	101	136	22
days_falling	236.3	9.27	236	214	259	0
total days in period of record						12784
total years in period of record						35

fish species present ?

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	6.3	4.39	5.5	1.35	48.2	0
	6.4	3.97	5.4	1.1	46.8	0
	5.9	3.6	4.9	1.42	72.7	0
	7.3	3.25	7.3	1.56	54.8	18
	12.6	4.51	12.9	1.59	44.3	87
	15.1	4.61	14.2	6.31	55.6	0
	11.3	3.65	12.5	4.64	53.7	0
	6.3	2.44	5.8	1.42	18.6	0
	4.6	2.24	4	1.08	32.4	0
	6	4.57	4.7	0.63	55.5	0
	7.9	7.03	6.8	0.97	101.8	0
	7.3	6.1	6	1.43	97.8	0
	8.1	5.35	7.1	0.63	101.8	105
	2	0.58	2	0.63	3.5	0
	2	0.59	2	0.69	3.6	0
	2.2	0.63	2.2	0.9	3.7	0
	2.8	0.77	2.8	1.08	4.9	0
	4.2	1.01	4.2	2.03	5.9	0
	43.5	20.53	40.5	14.2	101.8	6597
	31	13.09	27.1	14.2	65.1	7392
	23	7.17	20.9	14.2	38.7	6918
	16.5	3.57	15.2	13	27.7	6514
	13.4	1.68	12.9	10.63	18.3	856
	203.9	125.54	268	1	366	27
	192.4	89.11	163	14	362	7
	41.5	5.79	42	30	54	25
	38	5.28	39	23	48	23
	12	5.78	11	1	25	27
	7.1	2.58	7	3	12	8
	95.4	11.8	94	69	117	0
	194	17.4	197	162	237	0
total days in period of record						12784
total years in period of record						35

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		1033	1085
Feb		979	989
Mar		1048	1085
Apr	901		1050
May	1072		1085
Jun	1050		1050
Jul	1085		1085
Aug	847		1085
Sep	511		1050
Oct		971	1085
Nov		1026	1050
Dec		1063	1085

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	1033	527	1033	410	12	197	1085
Feb	979	477	979	367	5	192	989
Mar	1048	469	1048	349	3	162	1085
Apr	1034	677	1034	582	2	289	1050
May	1079	1063	1079	1042	34	870	1085
Jun	1050	1050	1050	1049	41	1025	1050
Jul	1085	1059	1085	1011	8	753	1085
Aug	1079	580	1079	421	0	183	1085
Sep	1022	283	1022	185	1	71	1050
Oct	971	448	971	360	7	197	1085
Nov	1026	663	1026	533	19	295	1050
Dec	1063	589	1063	479	14	262	1085

	summer	winter	total
Jan		1033	1085
Feb		979	989
Mar		1048	1085
Apr	901		1050
May	1072		1085
Jun	1050		1050
Jul	1085		1085
Aug	847		1085
Sep	511		1050
Oct		971	1085
Nov		1026	1050
Dec		1063	1085

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	1033	527	1033	410	2	197	1085
Feb	979	477	979	367	2	192	989
Mar	1048	469	1048	349	1	162	1085
Apr	1034	677	1034	582	1	289	1050
May	1079	1063	1079	1042	3	870	1085
Jun	1050	1050	1050	1049	4	1025	1050
Jul	1085	1059	1085	1011	3	753	1085
Aug	1079	580	1079	421	0	7	1085
Sep	1022	283	1022	185	0	7	1050
Oct	971	448	971	360	3	197	1085
Nov	1026	663	1026	533	7	295	1050
Dec	1063	589	1063	479	7	262	1085

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.321	0.1361	0.208	0.21	0.271	0.516	0.764		0.3	0.0974	0.208	0.21	0.271	0.416	0.764
Feb	0.321	0.1395	0.208	0.21	0.263	0.546	0.764		0.3	0.0974	0.208	0.21	0.263	0.443	0.764
Mar	0.301	0.1201	0.208	0.209	0.253	0.472	0.764		0.284	0.0824	0.208	0.209	0.253	0.416	0.764
Apr	0.357	0.1361	0.208	0.217	0.322	0.572	0.764		0.325	0.0842	0.208	0.217	0.322	0.419	0.764
May	0.552	0.144	0.209	0.352	0.551	0.756	0.764		0.473	0.0904	0.209	0.352	0.492	0.526	0.764
Jun	0.621	0.1046	0.287	0.479	0.62	0.764	0.764		0.535	0.0656	0.287	0.479	0.526	0.614	0.764
Jul	0.502	0.141	0.238	0.318	0.486	0.705	0.764		0.439	0.0794	0.238	0.318	0.481	0.481	0.764
Aug	0.312	0.112	0.208	0.212	0.272	0.481	0.764		0.293	0.073	0.208	0.212	0.272	0.405	0.618
Sep	0.264	0.0895	0.208	0.209	0.226	0.36	0.764		0.252	0.0556	0.208	0.209	0.226	0.357	0.764
Oct	0.318	0.1368	0.208	0.21	0.261	0.528	0.764		0.303	0.1036	0.208	0.21	0.261	0.468	0.764
Nov	0.362	0.1538	0.208	0.213	0.307	0.615	0.764		0.334	0.1123	0.208	0.213	0.307	0.440	0.764
Dec	0.343	0.1514	0.208	0.212	0.278	0.583	0.764		0.32	0.1111	0.208	0.212	0.278	0.458	0.764

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.383	0.1297	0.275	0.277	0.335	0.578	0.813		0.359	0.0941	0.275	0.277	0.335	0.452	0.813
Feb	0.373	0.1274	0.275	0.277	0.319	0.573	0.813		0.348	0.0808	0.275	0.277	0.319	0.430	0.813
Mar	0.358	0.112	0.275	0.278	0.311	0.52	0.813		0.338	0.0748	0.275	0.278	0.311	0.396	0.813
Apr	0.38	0.1281	0.275	0.277	0.324	0.587	0.813		0.341	0.0651	0.275	0.277	0.324	0.400	0.813
May	0.565	0.1631	0.275	0.338	0.56	0.803	0.813		0.471	0.0987	0.275	0.338	0.487	0.534	0.813
Jun	0.642	0.1252	0.285	0.469	0.643	0.813	0.813		0.537	0.0786	0.285	0.469	0.526	0.633	0.813
Jul	0.505	0.1604	0.275	0.299	0.479	0.742	0.813		0.429	0.0841	0.275	0.299	0.472	0.472	0.813
Aug	0.344	0.0975	0.275	0.276	0.301	0.483	0.813		0.321	0.0489	0.275	0.276	0.301	0.380	0.65
Sep	0.351	0.0913	0.275	0.277	0.316	0.459	0.813		0.338	0.0718	0.275	0.277	0.316	0.433	0.813
Oct	0.409	0.1411	0.275	0.278	0.364	0.61	0.902		0.39	0.1152	0.275	0.278	0.364	0.520	0.902
Nov	0.398	0.1498	0.275	0.277	0.334	0.652	0.813		0.365	0.1053	0.275	0.277	0.334	0.426	0.813
Dec	0.391	0.1404	0.275	0.277	0.333	0.614	0.813		0.363	0.0955	0.275	0.277	0.333	0.448	0.813

Heber

mad 4.94
 lat 49.815
 long 125.986

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	5.07	6.14	3.15	0	47.1	1138
Feb	4.72	4.63	3.35	0.188	43.3	1030
Mar	4.05	4.13	3.01	0.746	43.7	1175
Apr	4.64	3.42	3.77	1.25	40.2	1107
May	7.14	3.55	6.21	2.18	40.4	1002
Jun	5.96	2.76	5.32	1.5	28.7	908
Jul	4.33	2.68	3.57	0.641	29.1	990
Aug	2.14	2.21	1.55	0.215	31.9	1146
Sep	2.24	2.71	1.38	0.159	33.4	1108
Oct	6.46	8.47	3.57	0.104	64.3	1136
Nov	6.98	7.07	4.71	0	52.8	1088
Dec	5.59	6.06	3.6	0	46.1	1131
PoR	4.94	5.13	3.58	0	64.3	12959
one_day_min	0.54	0.31	0.56	0	1.6	929
three_day_min	0.58	0.31	0.6	0	1.7	958
seven_day_min	0.65	0.33	0.66	0.082	1.7	982
thirty_day_min	1.06	0.48	1.01	0.298	2.2	1143
ninety_day_min	2.06	0.8	2.03	0.754	4	1538
one_day_max	40.61	11.56	41.08	17.729	64.3	120
three_day_max	29.44	8.41	29.59	13.293	48.4	197
seven_day_max	20.74	5.6	19.6	11.264	33.9	371
thirty_day_max	11.35	2.66	10.43	6.771	18.1	1357
ninety_day_max	8.28	1.51	8.48	5.172	11.3	2319
julian_date_of_annual_minima	226.89	107.67	266	1	366	31
julian_date_of_annual_maxima	223.27	121.45	295	5	355	27
low_pulses	52.1	4.87	51	43	67	30
high_pulses	52.88	5.13	52	42	68	32
days_below_threshold	10.41	4.24	10	3	20	24
days_above_threshold	21.9	6.95	21	9	38	30
days_rising	115.63	11.18	116	94	139	28
days_falling	245.29	11.59	243	222	269	0
total days in period of record						14975
total years in period of record						41

fish species present summer steelhead
 rainbow
 Dolly Varden

regulated flows - 90th to 20th percentile rule

	mean	std.dev	median	min	max	days within target range
	3.76	4.34	3.15	0	40.1	0
	3.45	2.87	3.35	0.188	36.3	0
	3.19	2.78	3.01	0.746	36.7	0
	3.55	2.05	3.77	1.25	33.3	170
	4.66	1.79	4.5	2.18	33.5	1226
	4.22	0.98	4.45	1.5	21.7	1205
	3.32	1.26	3.57	0.641	22.1	198
	1.88	1.42	1.55	0.215	25	120
	1.93	1.74	1.38	0.159	26.5	104
	4.68	6.48	3.57	0.104	57.3	79
	4.76	5.12	3.98	0	45.8	1
	4.02	4.15	3.6	0	39.2	0
	3.62	3.49	3.58	0	57.3	3103
	0.54	0.31	0.56	0	1.6	1
	0.58	0.31	0.6	0	1.7	3
	0.65	0.33	0.66	0.082	1.7	2
	1.06	0.47	1.01	0.298	2.2	0
	1.88	0.63	1.9	0.754	3.1	0
	33.65	11.56	34.12	10.771	57.3	554
	22.56	8.3	22.63	7.443	41.5	954
	14.48	5.18	13.53	5.792	27	1960
	7.5	2.14	6.86	4.762	13.4	8289
	5.48	1.06	4.99	3.931	7.6	11204
	226.89	107.67	266	1	366	34
	221.9	123.89	295	4.5	351	2
	36.46	5.29	35	24	53	24
	33.17	5.01	33	21	45	10
	10.41	4.24	10	3	20	39
	10.07	3.09	10	5	20	22
	83.51	11.17	82	54	119	0
	183.59	24.63	183	118	230	0
total days in period of record						14975
total years in period of record						41

Days >= Tennant's "good" criteria

	summer	winter	total
Jan		1116	1271
Feb		1082	1158
Mar		1243	1271
Apr	1110		1230
May	1271		1271
Jun	1229		1230
Jul	1078		1271
Aug	441		1271
Sep	431		1230
Oct		1034	1271
Nov		1195	1230
Dec		1215	1271

Days >= Ptolemy's criteria

	juv.rear	adult.rear	overwint	spawn	chan.mair	wet.link	total
Jan	1116	713	1116	461	45	386	1271
Feb	1082	707	1082	415	19	340	1158
Mar	1243	714	1243	364	20	279	1271
Apr	1230	880	1230	511	10	396	1230
May	1271	1245	1271	1060	9	921	1271
Jun	1230	1160	1230	860	1	703	1230
Jul	1255	867	1255	521	2	407	1271
Aug	987	257	987	132	2	91	1271
Sep	788	271	788	149	2	122	1230
Oct	1034	732	1034	572	84	511	1271
Nov	1195	937	1195	669	65	582	1230
Dec	1215	784	1215	528	48	454	1271

summer winter total

Jan		1116	1271
Feb		1082	1158
Mar		1243	1271
Apr	1110		1230
May	1271		1271
Jun	1229		1230
Jul	1078		1271
Aug	441		1271
Sep	431		1230
Oct		1034	1271
Nov		1195	1230
Dec		1215	1271

juv.rear adult.rear overwint spawn chan.mair wet.link total

Jan	1116	713	1116	461	24	110	1271
Feb	1082	707	1082	415	8	83	1158
Mar	1243	714	1243	364	9	47	1271
Apr	1230	880	1230	511	6	34	1230
May	1271	1245	1271	1060	3	101	1271
Jun	1230	1160	1230	860	1	46	1230
Jul	1255	867	1255	521	1	17	1271
Aug	987	257	987	132	2	10	1271
Sep	788	271	788	149	1	22	1230
Oct	1034	732	1034	572	48	184	1271
Nov	1195	937	1195	669	32	186	1230
Dec	1215	784	1215	528	22	130	1271

meta-analysis risk summary - juvenile

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.348	0.1532	0.203	0.212	0.291	0.603	0.995		0.303	0.1177	0.203	0.212	0.291	0.433	0.995
Feb	0.325	0.1363	0.203	0.209	0.268	0.556	0.804		0.274	0.084	0.203	0.209	0.268	0.343	0.804
Mar	0.292	0.1118	0.203	0.208	0.247	0.439	0.688		0.256	0.069	0.203	0.208	0.247	0.271	0.688
Apr	0.31	0.1158	0.203	0.208	0.265	0.484	0.688		0.26	0.0578	0.203	0.208	0.265	0.284	0.688
May	0.42	0.1242	0.204	0.268	0.4	0.6	0.688		0.31	0.059	0.204	0.268	0.305	0.305	0.688
Jun	0.373	0.1176	0.204	0.229	0.351	0.551	0.688		0.291	0.0426	0.204	0.229	0.303	0.303	0.688
Jul	0.308	0.1099	0.203	0.208	0.263	0.475	0.688		0.259	0.0454	0.203	0.208	0.263	0.291	0.688
Aug	0.287	0.0982	0.203	0.205	0.25	0.424	0.769		0.275	0.0874	0.203	0.205	0.25	0.394	0.769
Sep	0.336	0.1375	0.203	0.208	0.29	0.562	0.846		0.323	0.126	0.203	0.208	0.29	0.519	0.846
Oct	0.407	0.1722	0.203	0.215	0.361	0.688	0.917		0.354	0.1481	0.203	0.215	0.317	0.656	0.917
Nov	0.382	0.1664	0.203	0.212	0.326	0.688	0.995		0.304	0.1224	0.203	0.212	0.276	0.488	0.995
Dec	0.346	0.1548	0.203	0.208	0.282	0.62	0.995		0.292	0.1087	0.203	0.208	0.282	0.370	0.995

meta-analysis risk summary - spawning

	mean	std.dev	min	ptile.10	median	ptile.90	max		mean	std.dev	min	ptile.10	median	ptile.90	max
Jan	0.453	0.1774	0.269	0.274	0.393	0.693	1		0.411	0.1793	0.269	0.274	0.303	0.693	1
Feb	0.407	0.1486	0.269	0.273	0.342	0.674	0.988		0.363	0.1394	0.269	0.273	0.282	0.614	0.988
Mar	0.38	0.1223	0.269	0.272	0.33	0.577	0.756		0.352	0.1183	0.269	0.272	0.287	0.541	0.756
Apr	0.346	0.0901	0.269	0.272	0.314	0.469	0.693		0.305	0.0639	0.269	0.272	0.275	0.383	0.693
May	0.398	0.1193	0.269	0.275	0.357	0.585	0.693		0.296	0.053	0.269	0.275	0.285	0.297	0.693
Jun	0.361	0.1008	0.269	0.273	0.324	0.521	0.693		0.287	0.0286	0.269	0.273	0.283	0.290	0.693
Jul	0.358	0.0993	0.269	0.273	0.321	0.501	0.807		0.317	0.0844	0.269	0.273	0.276	0.415	0.807
Aug	0.503	0.1803	0.269	0.286	0.472	0.773	0.982		0.494	0.1863	0.269	0.271	0.467	0.773	0.982
Sep	0.558	0.2194	0.269	0.287	0.535	0.883	0.992		0.546	0.2263	0.269	0.287	0.51	0.883	0.992
Oct	0.517	0.2028	0.269	0.277	0.483	0.787	0.998		0.465	0.2156	0.269	0.277	0.35	0.787	0.998
Nov	0.421	0.1544	0.269	0.273	0.363	0.693	1		0.352	0.1348	0.269	0.273	0.274	0.587	1
Dec	0.424	0.1473	0.269	0.274	0.375	0.686	1		0.373	0.139	0.269	0.274	0.287	0.607	1

APPENDIX E.

PRE- AND POST-PROJECT FLOWS

BASED ON FLOW THRESHOLDS FOR FISHLESS STREAMS

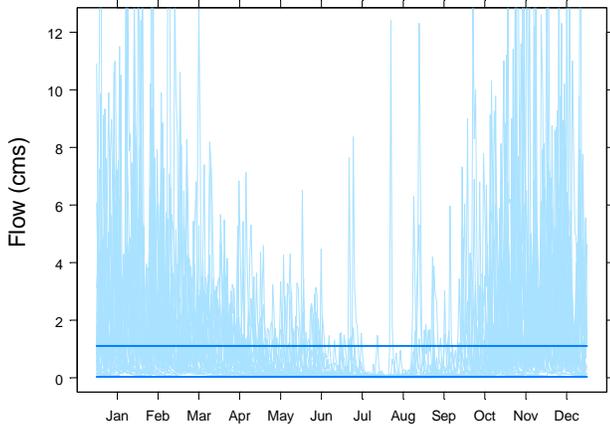
Nineteen sites on BC streams were selected for investigating the appropriateness of different standard-setting approaches (Table A1). This appendix presents a series of figures to indicate what the proposed fishless stream flow rule looks like relative to natural flows, and the simulated performance of those rules on the selected streams.

The first set of figures present natural flow records for each of the test streams. The light blue represents mean daily flows, with flow time series superimposed for each year on record. The dark blue lines show the minimum and maximum diversion amounts for the proposed rule. The calculation of the rule is explained in the main body of the report and in Appendix B.

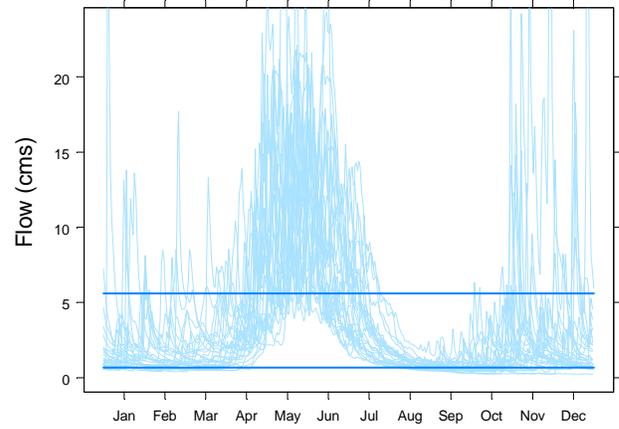
The second set of figures shows simulated pre- and post-project flows using the proposed fishless stream diversion rule for each of the test streams. (Note: the purpose is to understand the effects of the diversion rule; in reality each of these streams is likely fish-bearing.) Three of the graphs are multipanel plots where each panel represents a year from the period of record over a total of nine years. The y-axis is limited to 50% of the maximum flow on record to enhance resolution for low flow periods. These plots allow one to visualize variation in timing, magnitude, and duration of flows from one year to another. The plot in the upper left shows natural mean daily flows. The plot in the upper right shows regulated flows in the diversion section. Plots in the lower left show simulated diversion flows. In each plot the blue line represents MAD.

Plots in the lower right present the quantiles for mean daily natural flows (black line) and mean daily regulated flows (red line) for the period of record. The point at which the two lines diverge represents the frequency break point for diversion. The break point is the frequency at which diversion does not occur under this diversion rule. For example, on the Heber River diversion does not occur approximately 20% of the time.

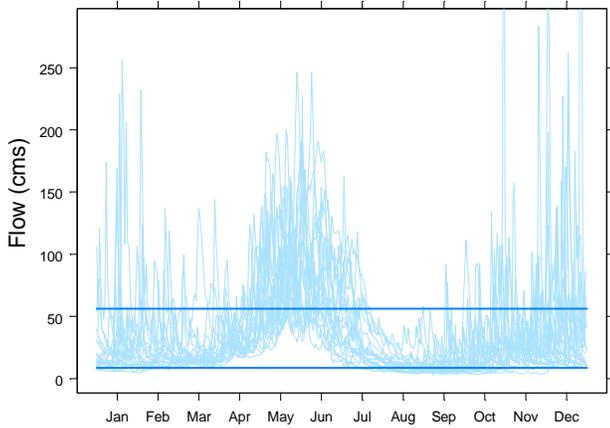
Carnation



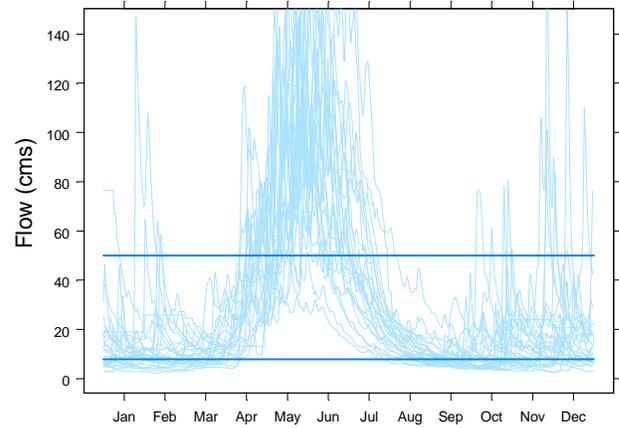
Coquihalla below Needle



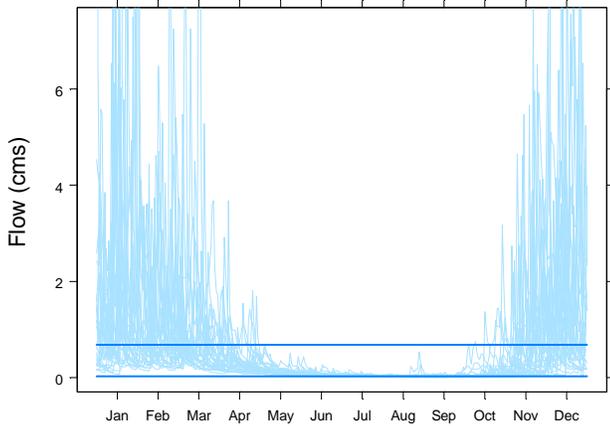
Coquihalla near Hope



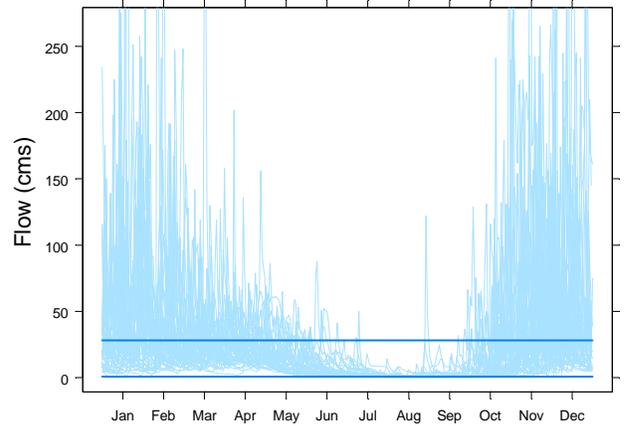
Skagit



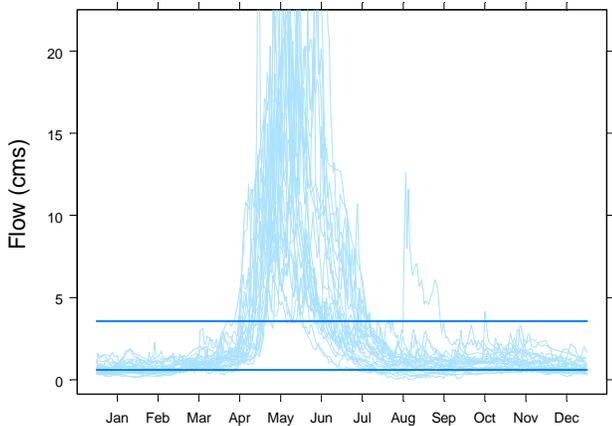
Bings



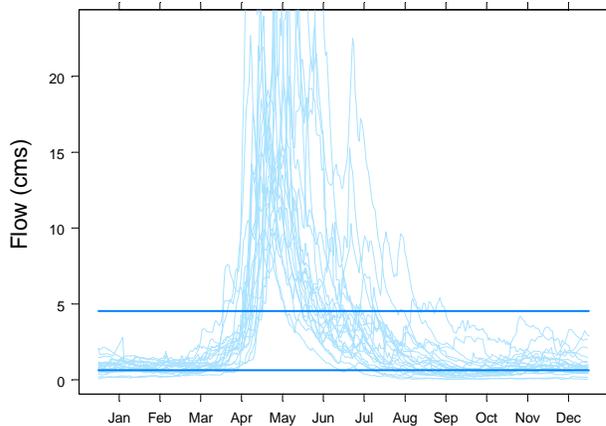
Chemainus



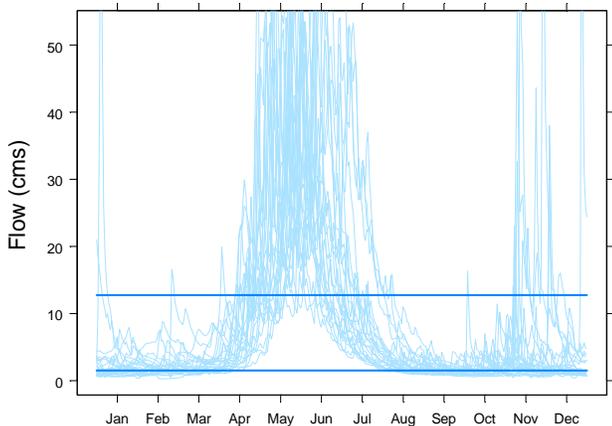
Louis



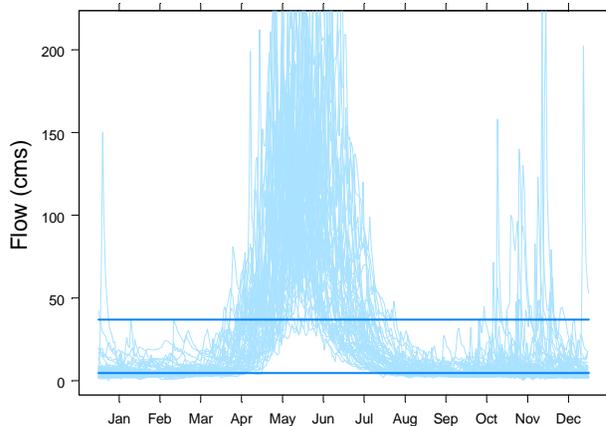
Lemieux



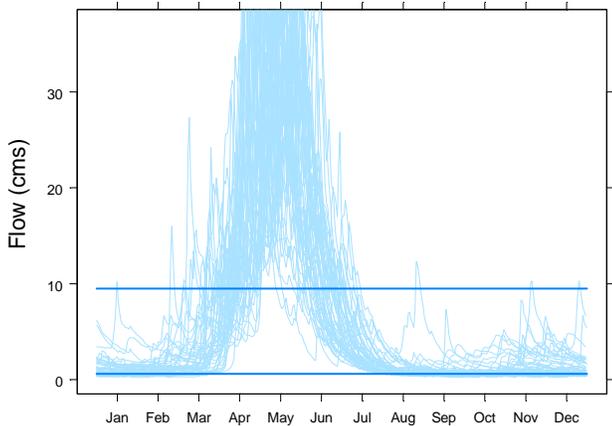
Similkameen above Goodfellow



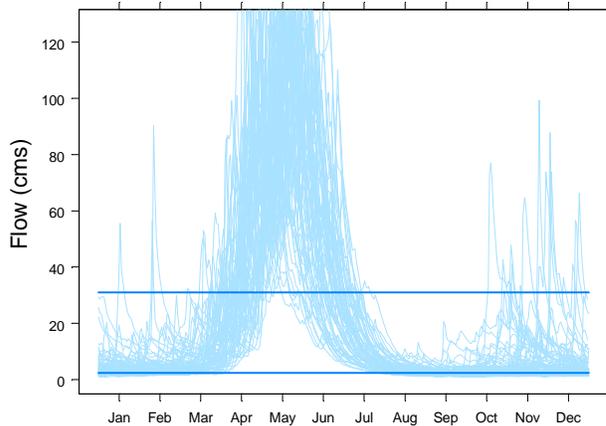
Similkameen near Princeton



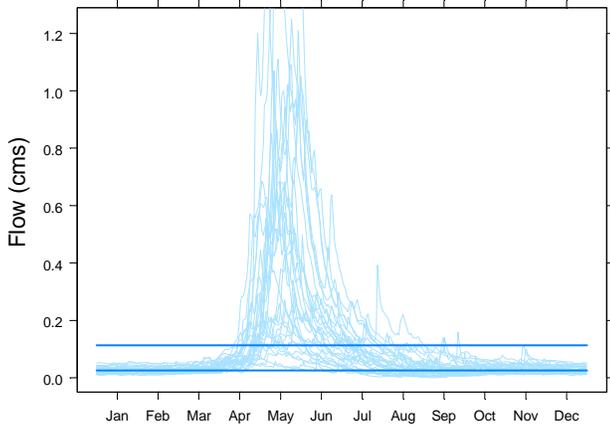
Big Sheep



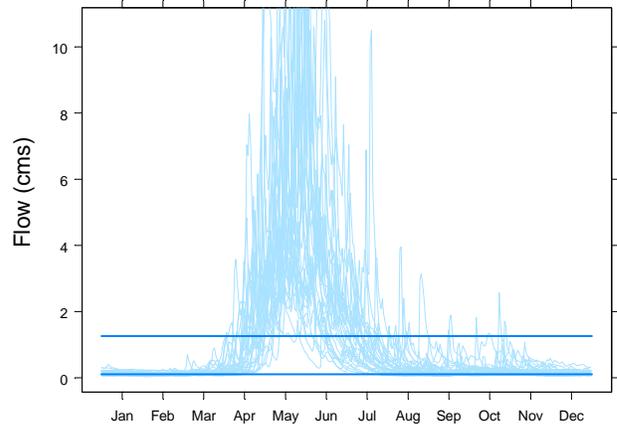
Moyie



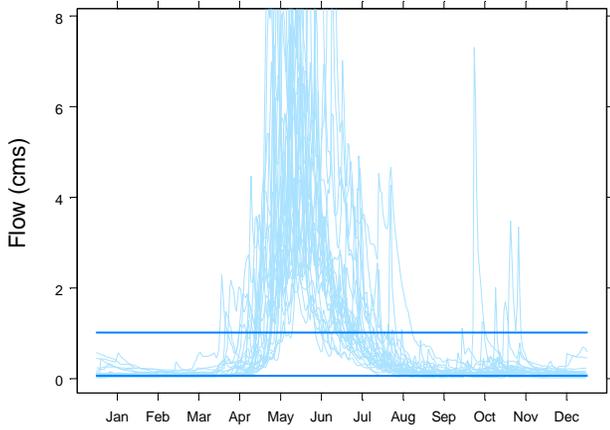
Greata



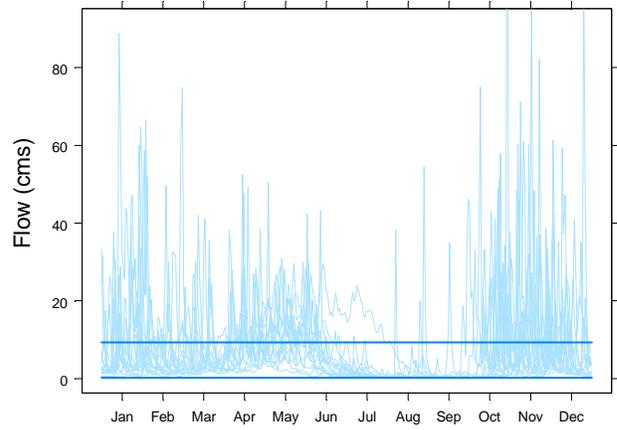
Vaseux



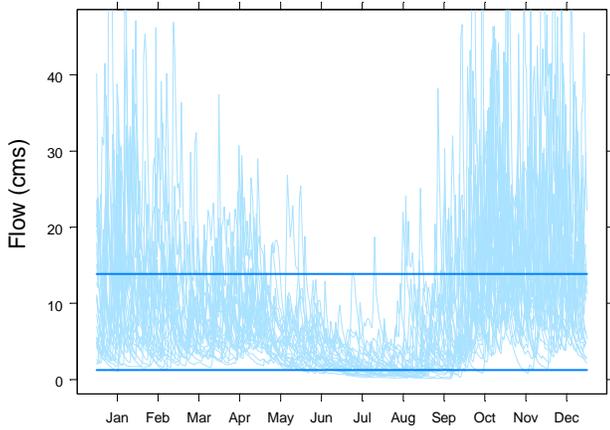
Lingfield



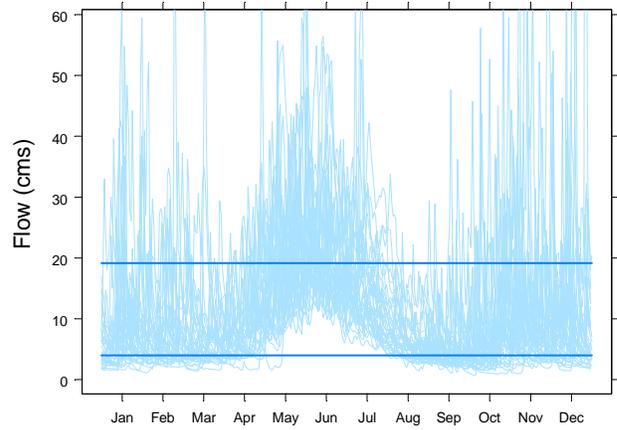
Browns



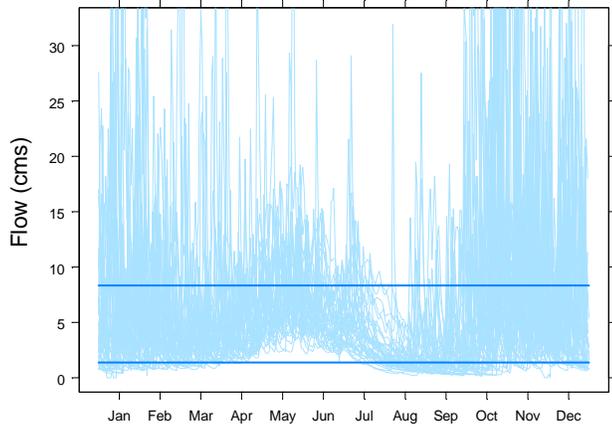
Pallant



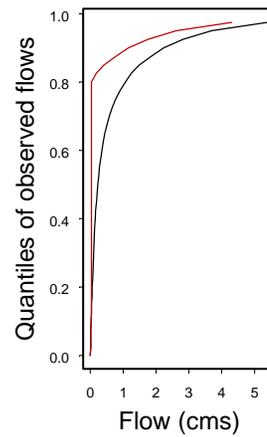
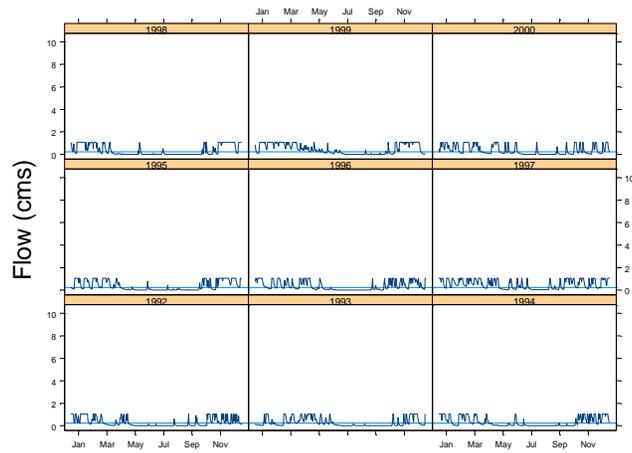
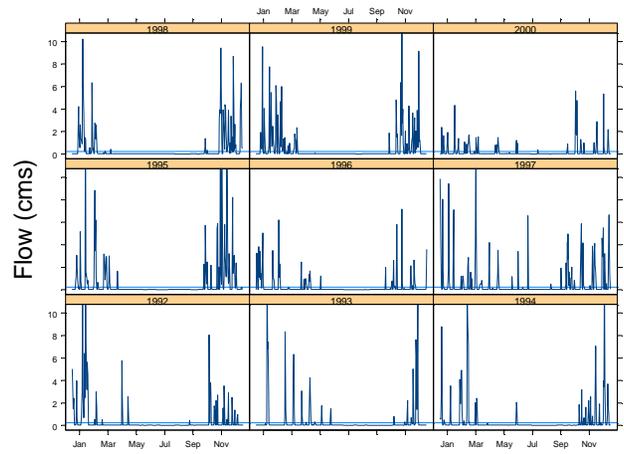
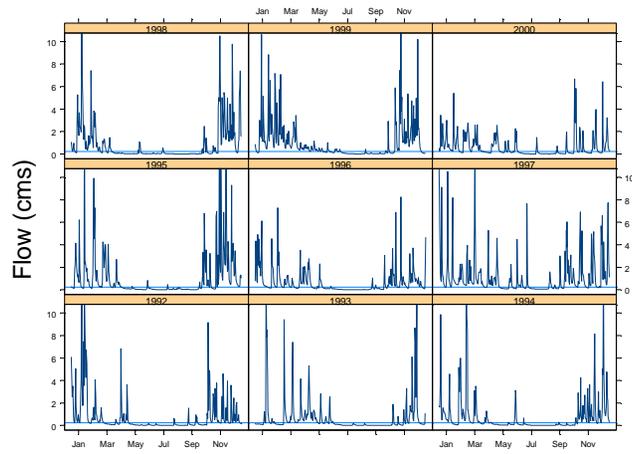
Sleese



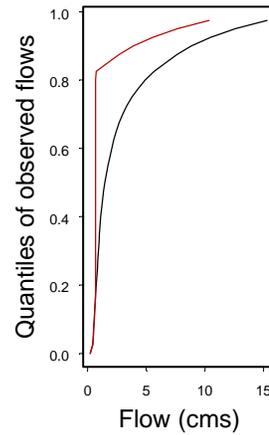
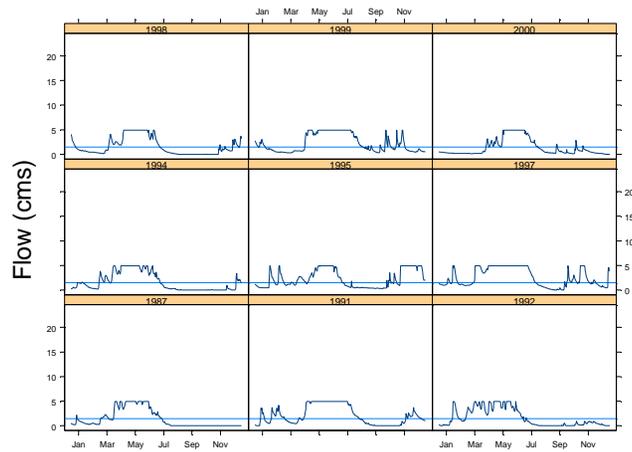
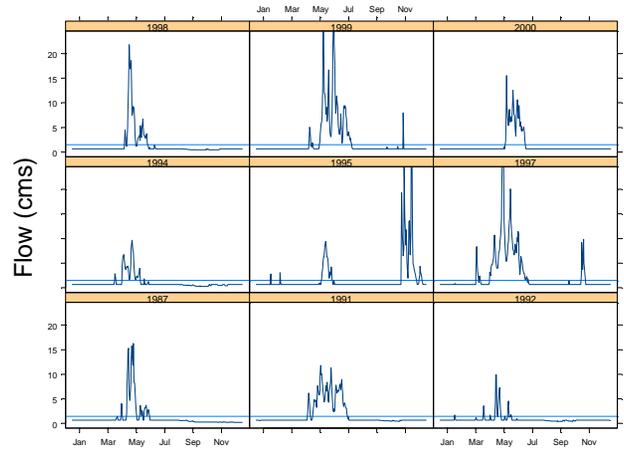
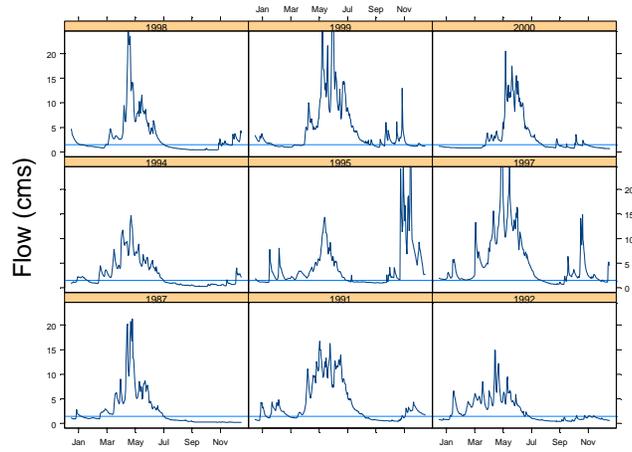
Heber



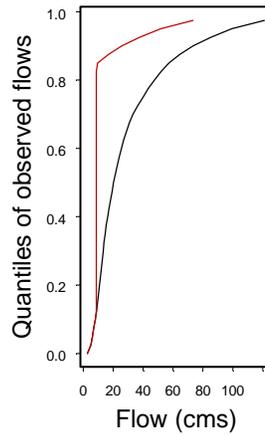
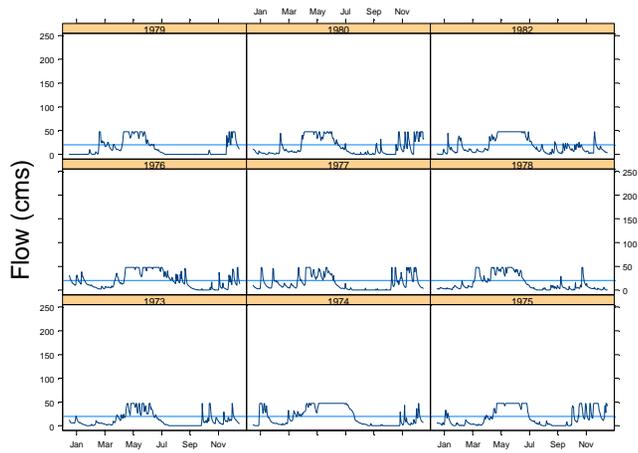
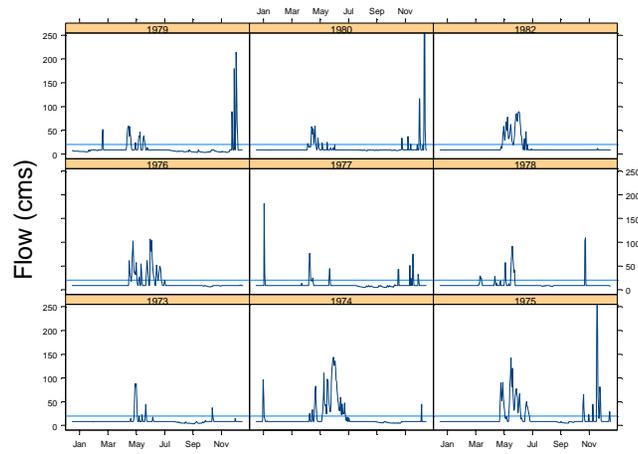
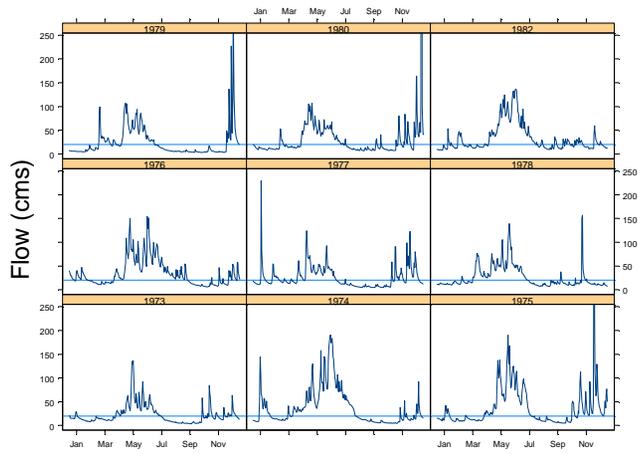
Station Name: Carnation Creek at the mouth
Station ID: 08HB048
Period of record: 1973-2000



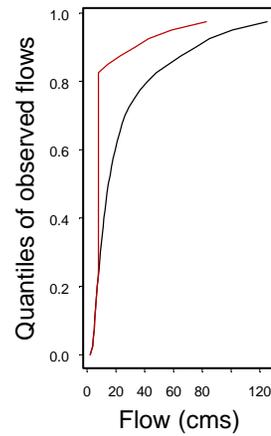
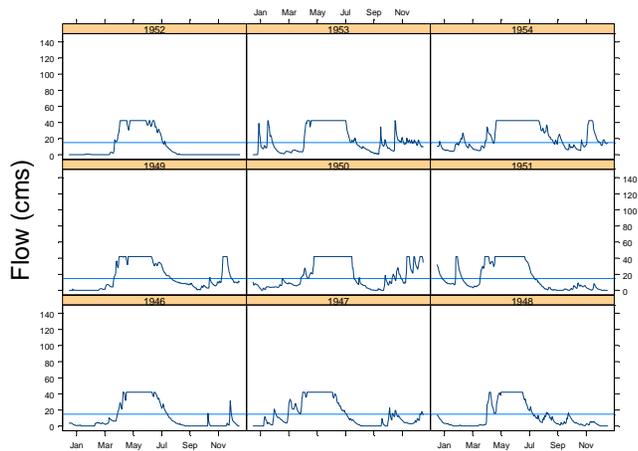
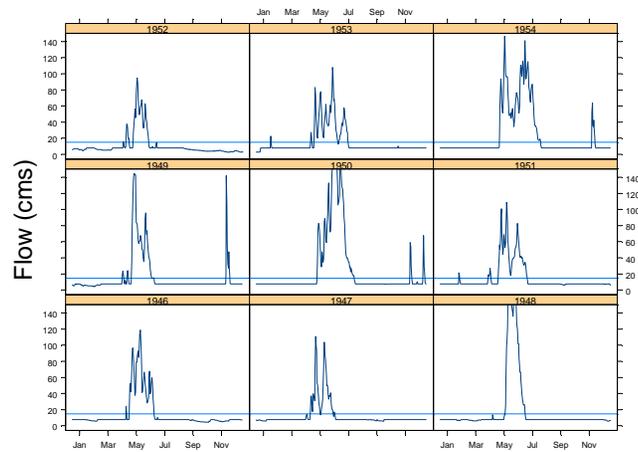
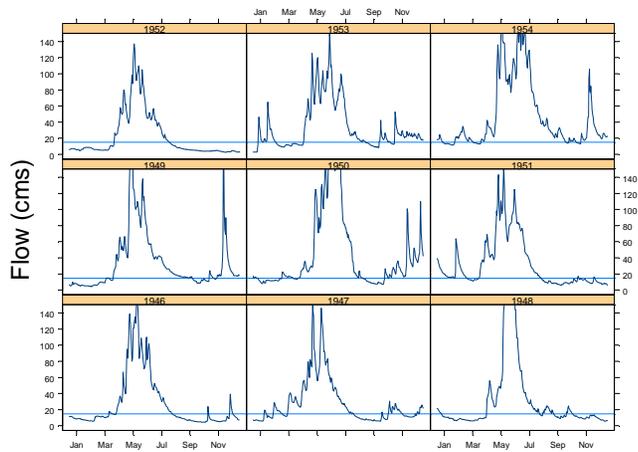
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Station ID: 08MF062
Period of record: 1965-2000



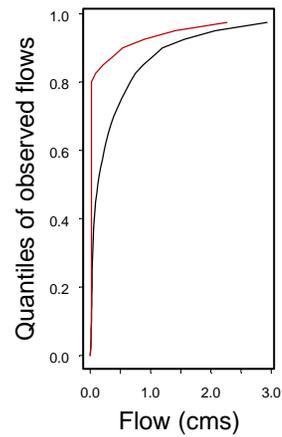
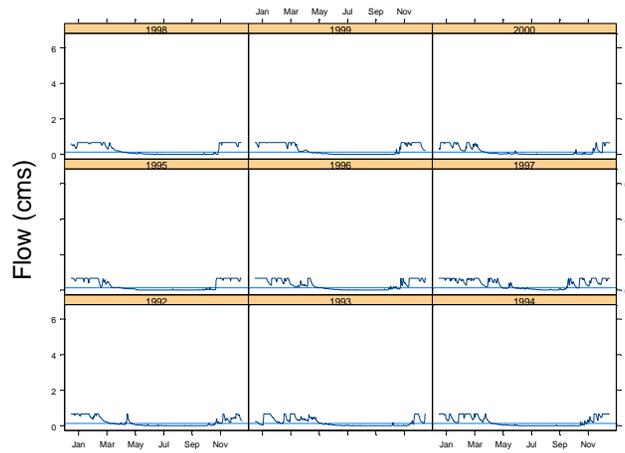
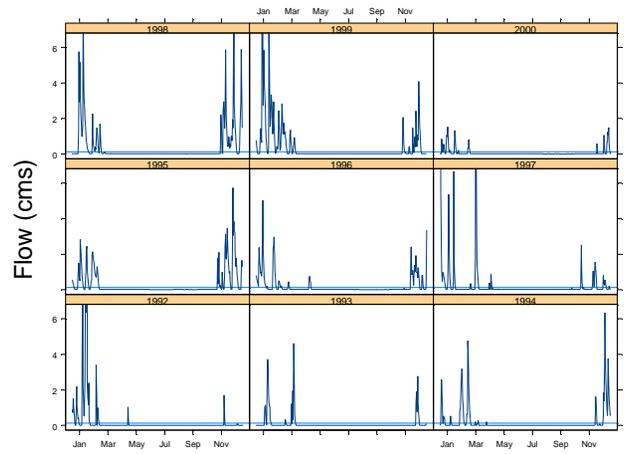
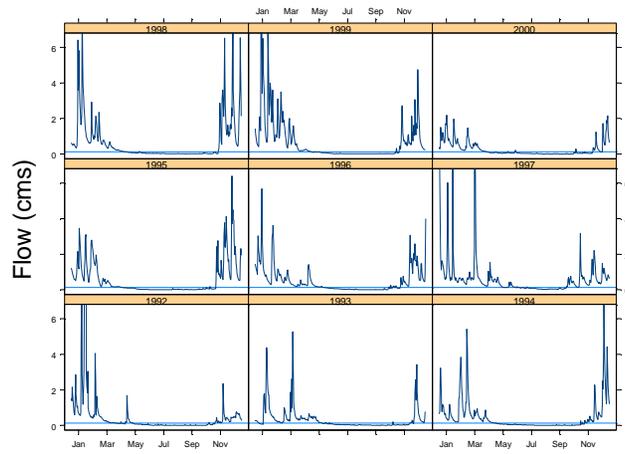
Station Name: Coquihalla near Hope
Station ID: 08MF003
Period of record: 1911-1983



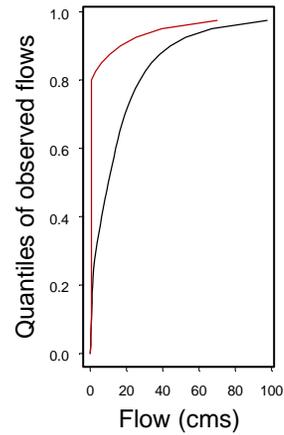
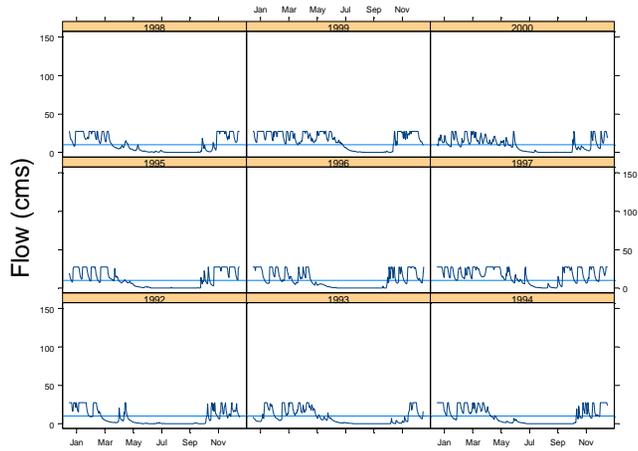
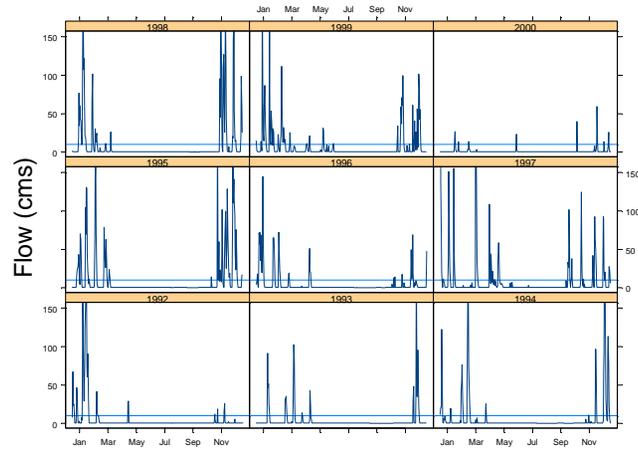
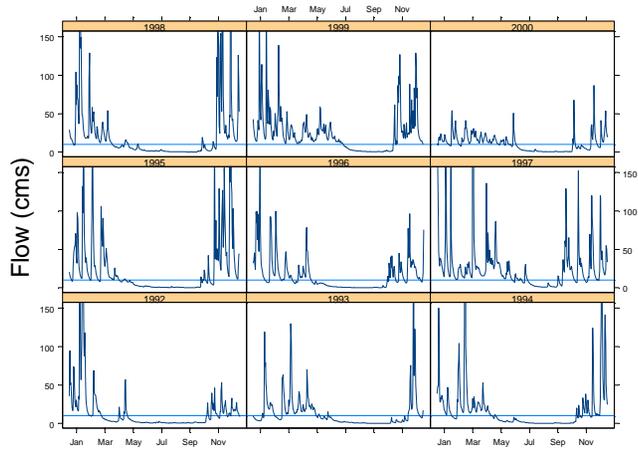
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Station ID: 08PA001
Period of record: 1915-1955



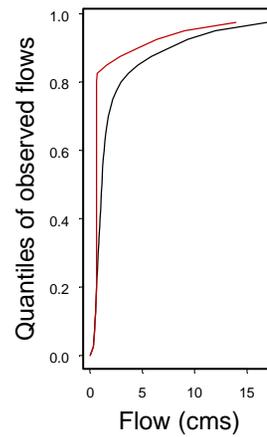
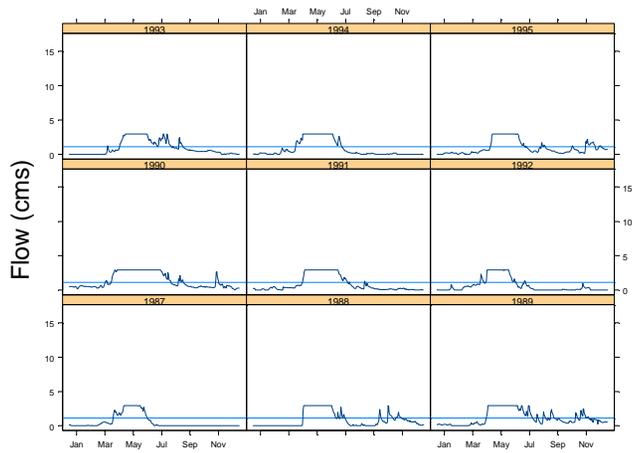
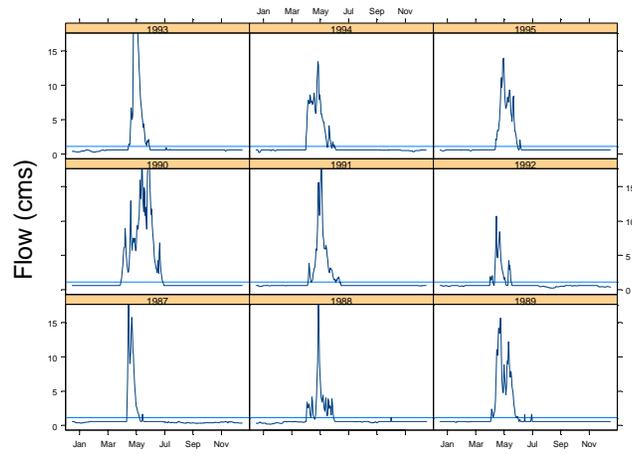
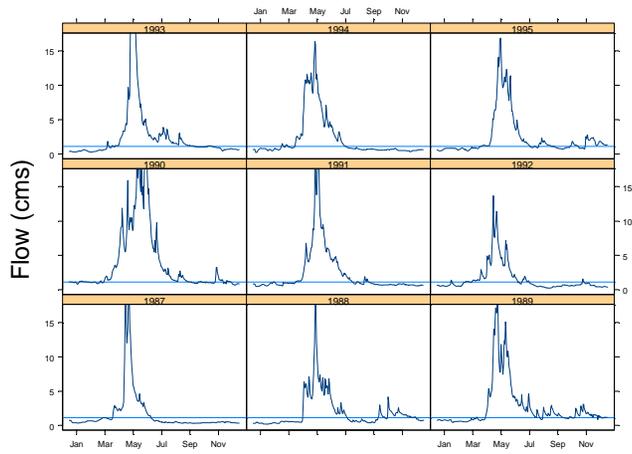
Station Name: Bings Creek near mouth
Station ID: 08HA016
Period of record: 1961-2000



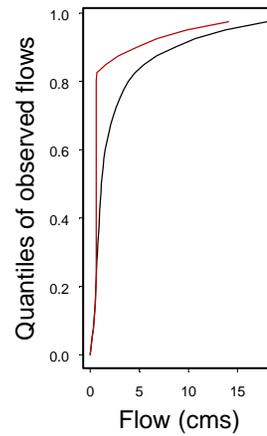
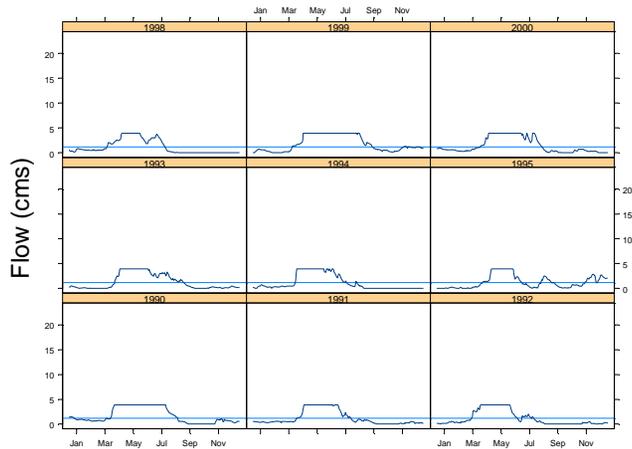
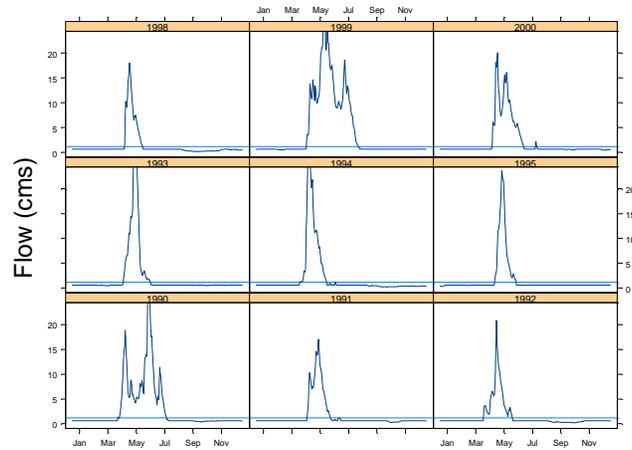
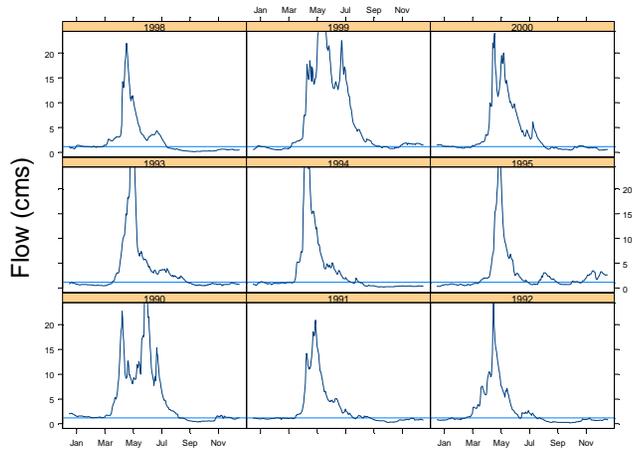
Station Name: Chemainus near Westholme
Station ID: 08HA001
Period of record: 1914-2000



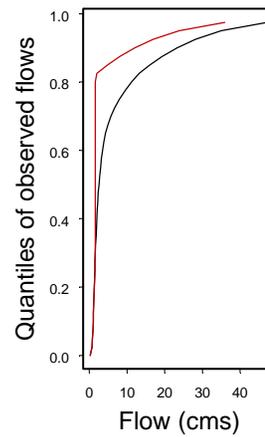
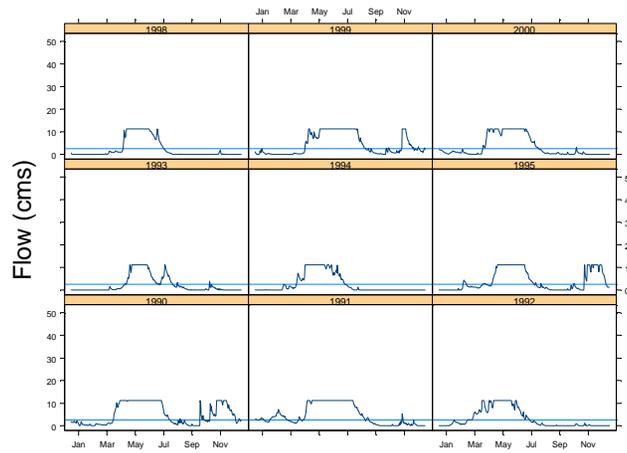
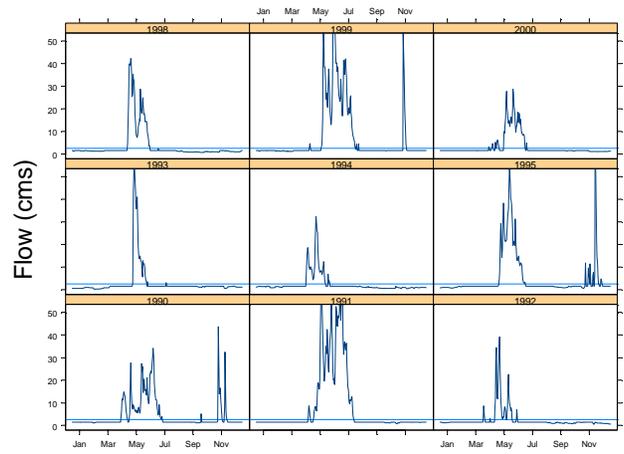
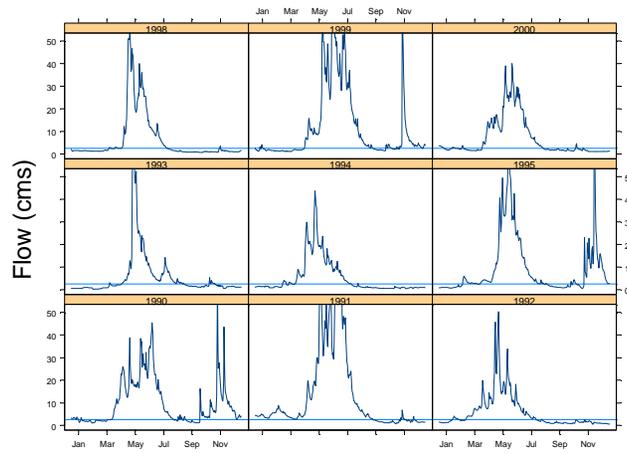
Station Name: Louis Creek at mouth
Station ID: 08LB072
Period of record: 1971-1996



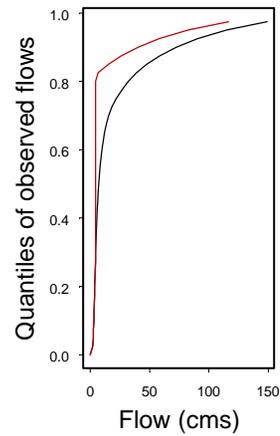
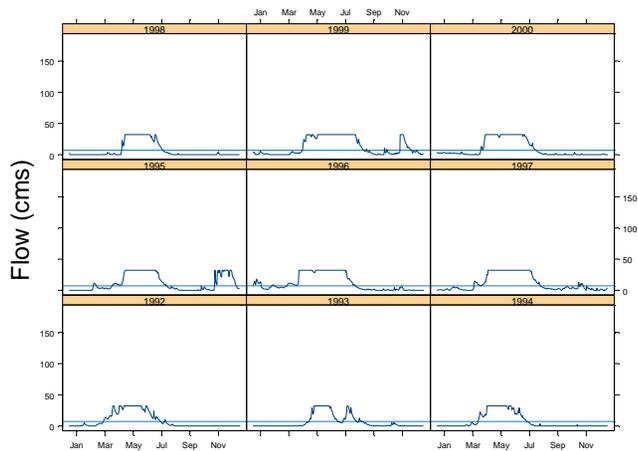
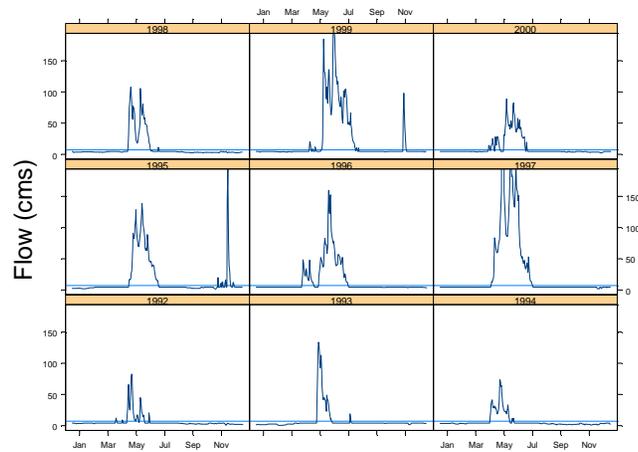
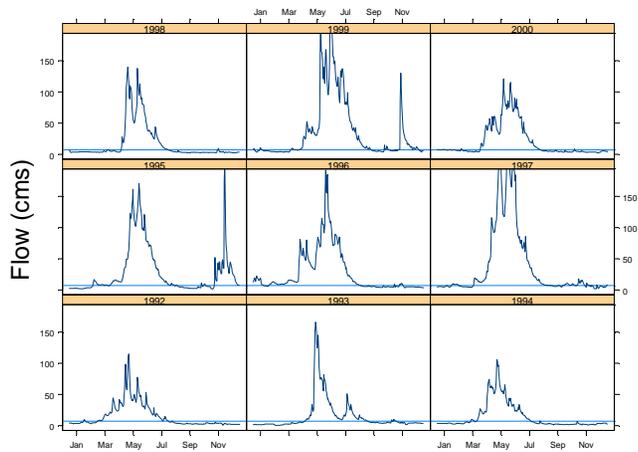
Station Name: Lemieux Creek at mouth
Station ID: 08LB078
Period of record: 1977-2000



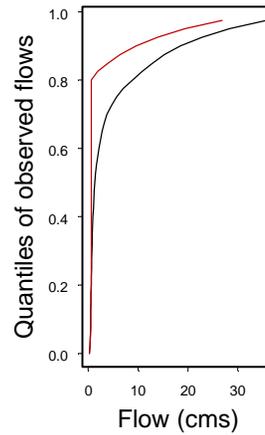
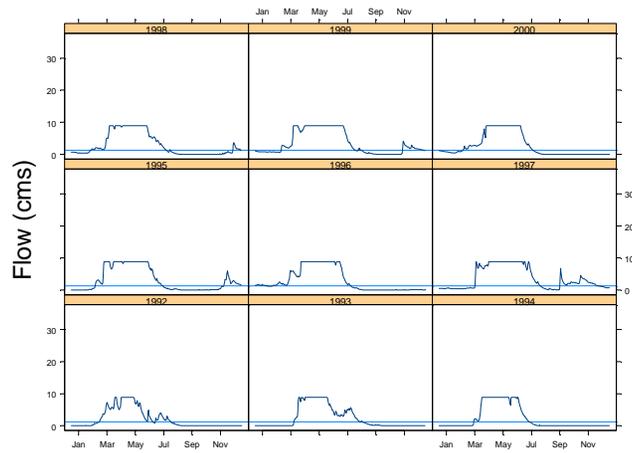
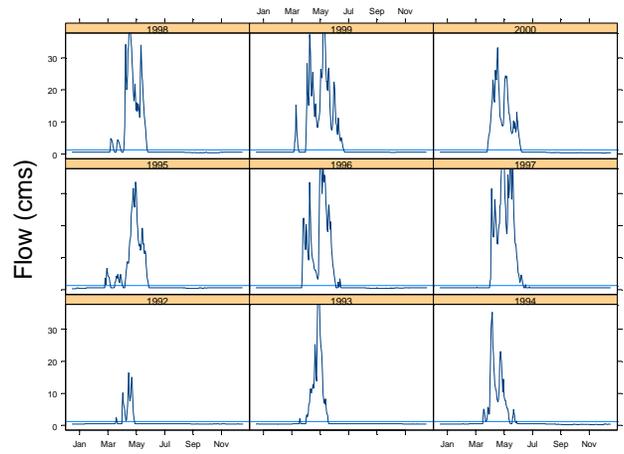
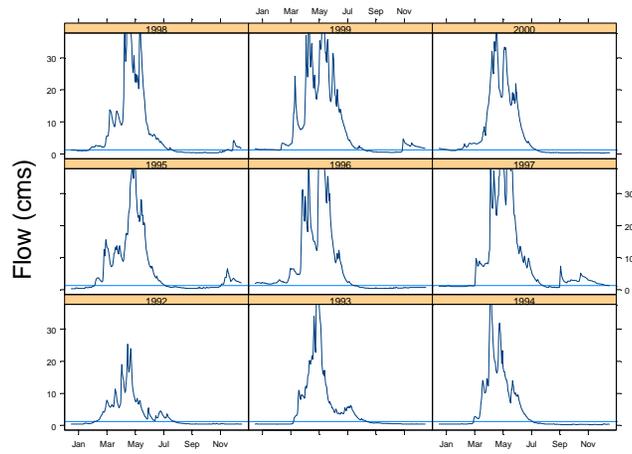
Station Name: Similkameen above Goodfellow Creek
Station ID: 08NL070
Period of record: 1974-2000



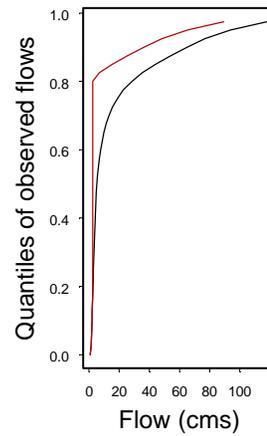
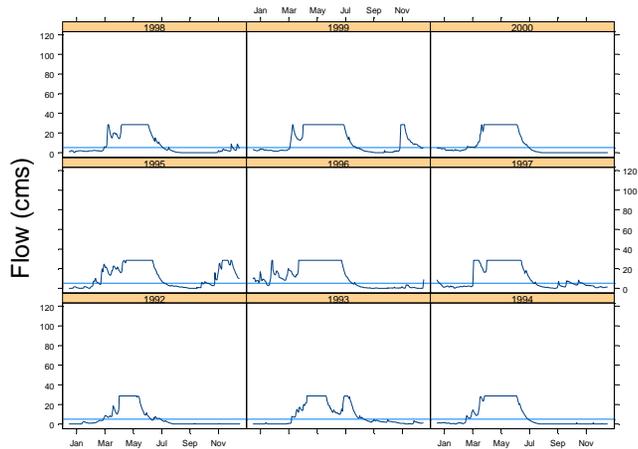
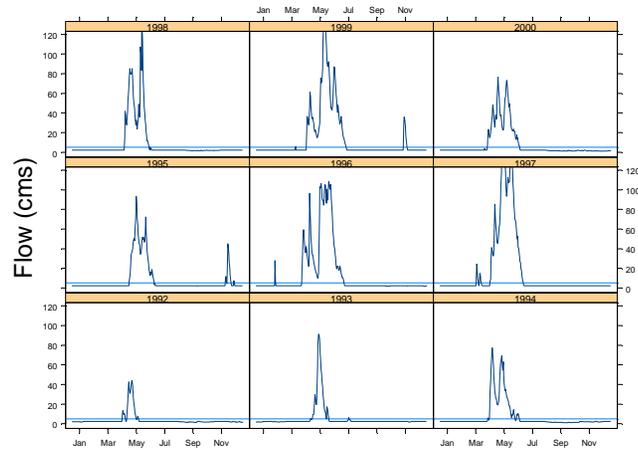
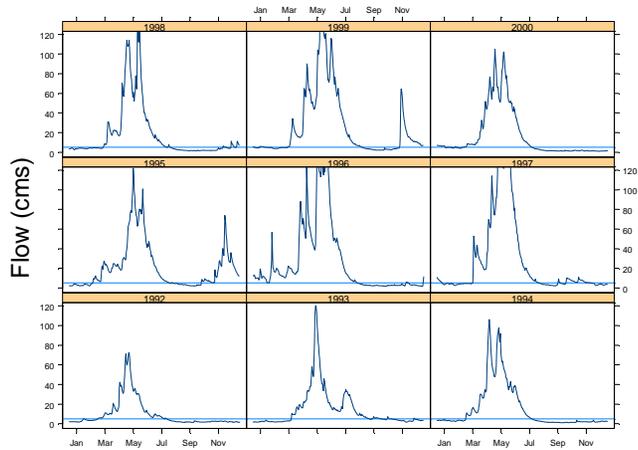
Station Name: Similkameen near Princeton
Station ID: 08NL007
Period of record: 1914-2000



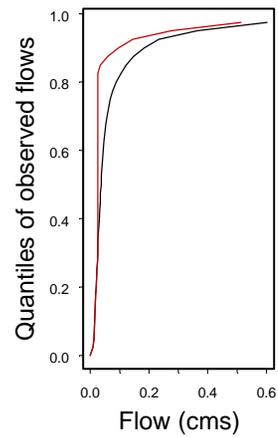
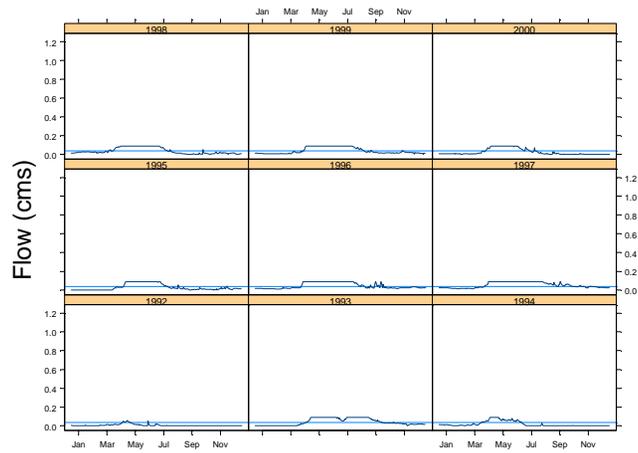
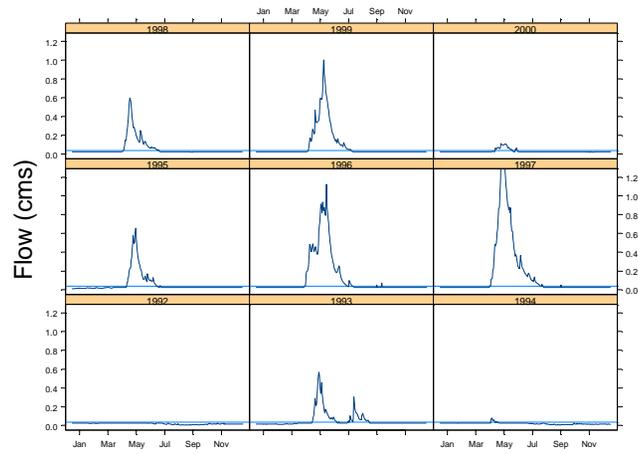
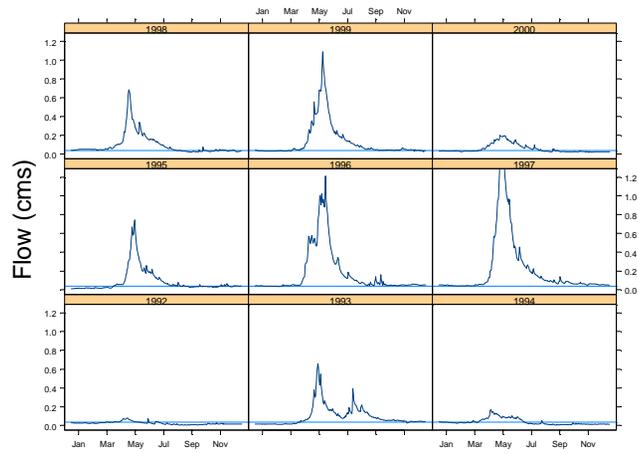
Station Name: Big Sheep Creek near Rossland
Station ID: 08NE039
Period of record: 1929-2000



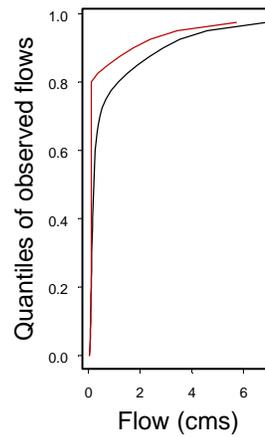
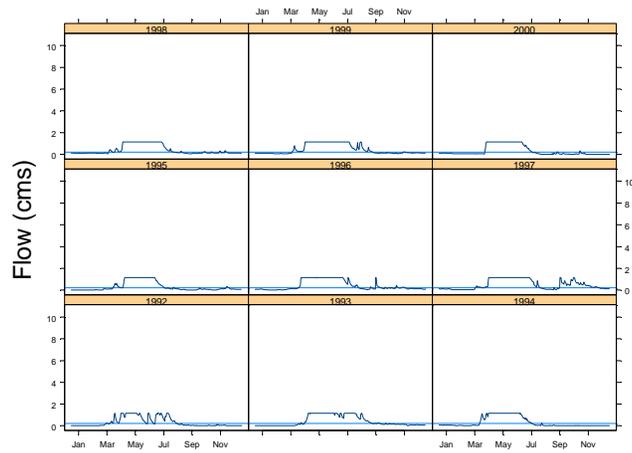
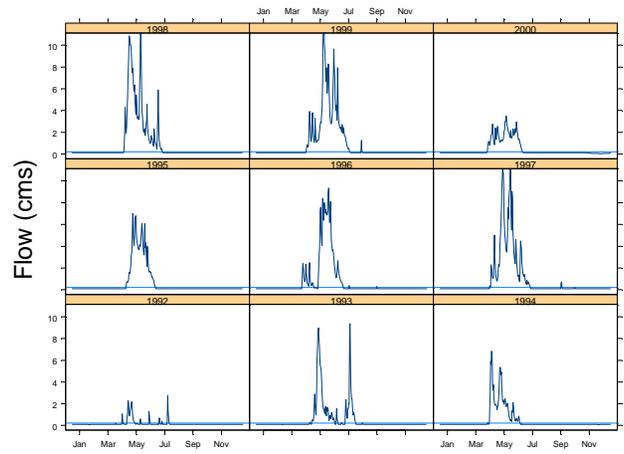
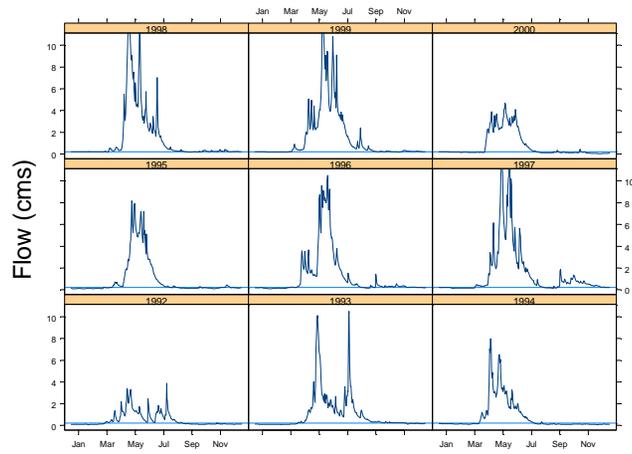
Station Name: Moyie River at Eastport
Station ID: 08NH006
Period of record: 1915-2000



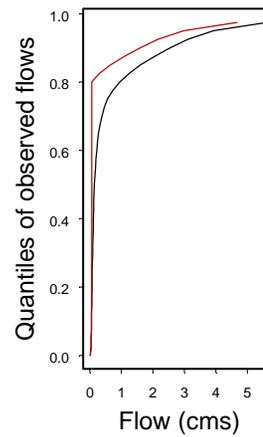
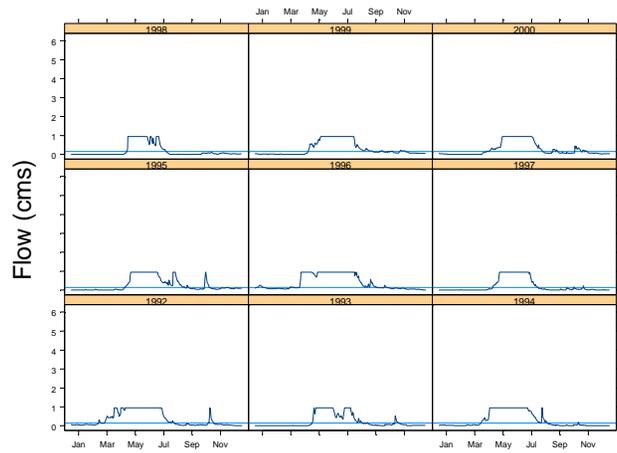
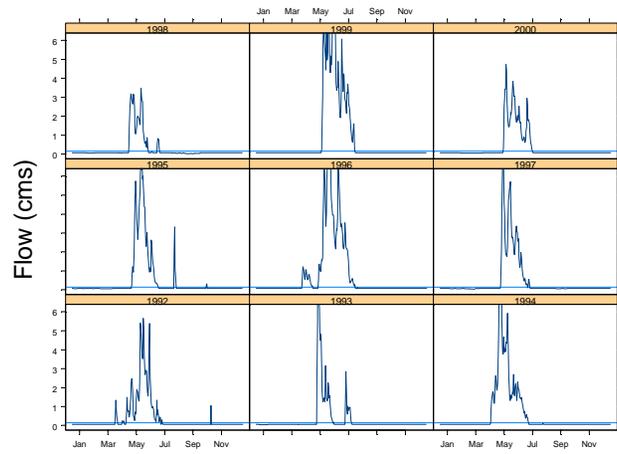
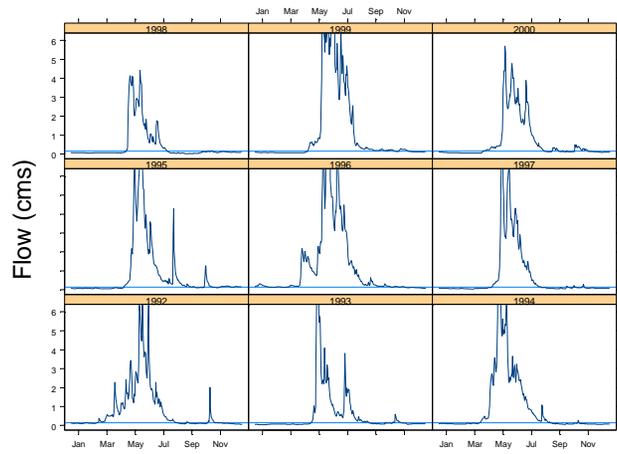
Station Name: Greata Creek near mouth
Station ID: 08NM173
Period of record: 1970-2000



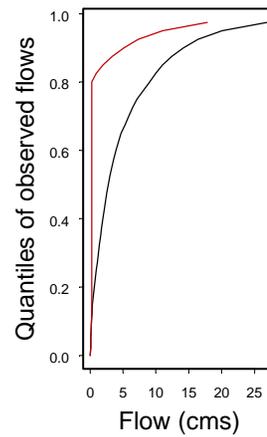
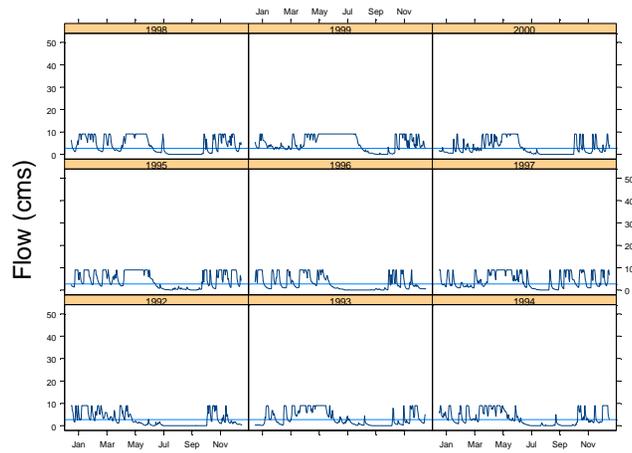
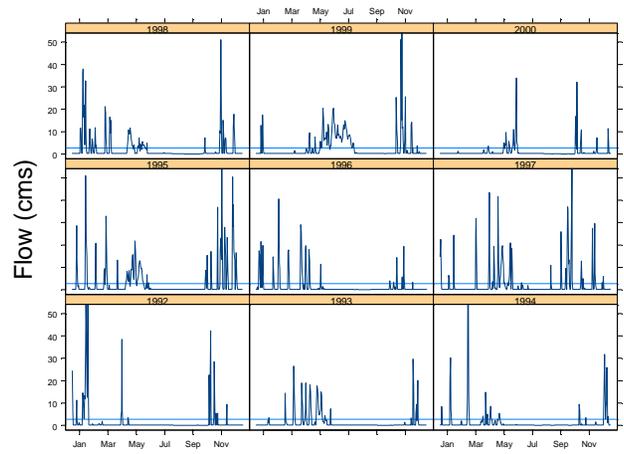
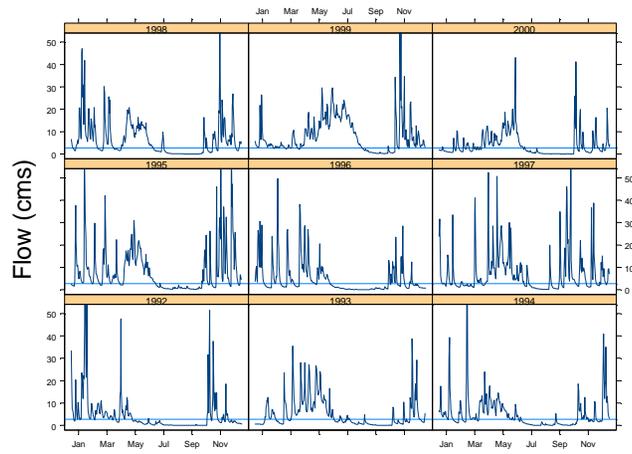
Station Name: Vaseux Creek above Solco Creek
Station ID: 08NM171
Period of record: 1970-2000



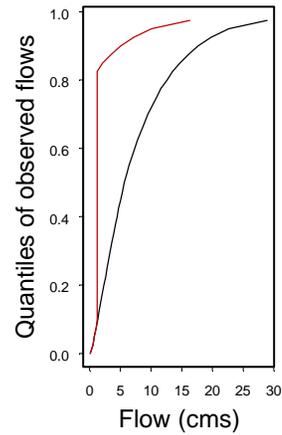
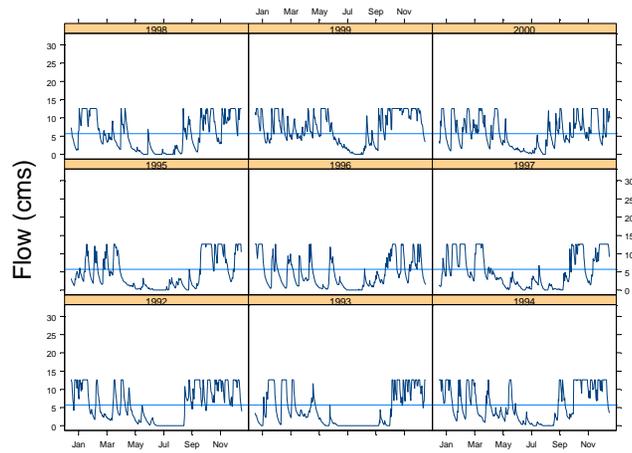
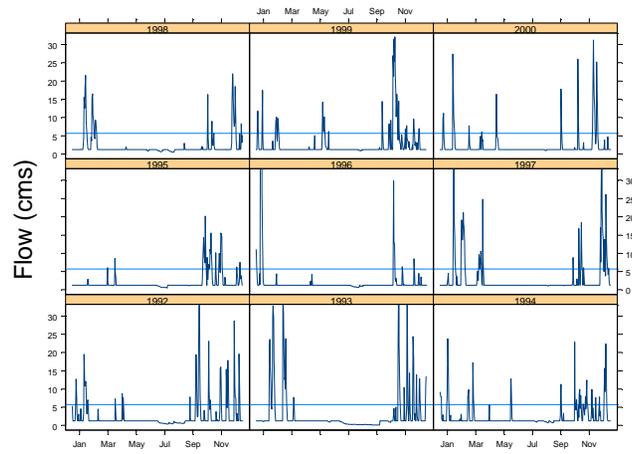
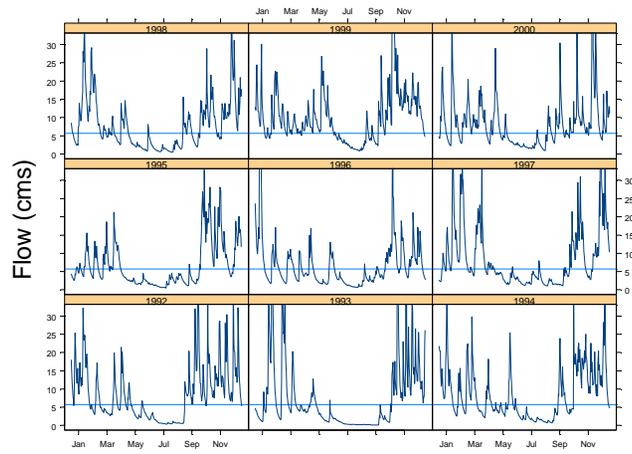
Station Name: Lingfield Creek at mouth
Station ID: 08MA006
Period of record: 1974-2000



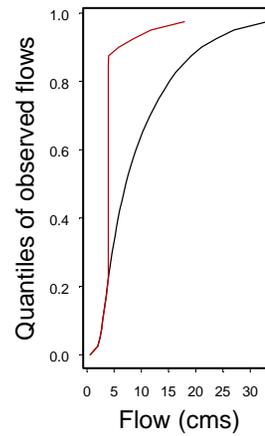
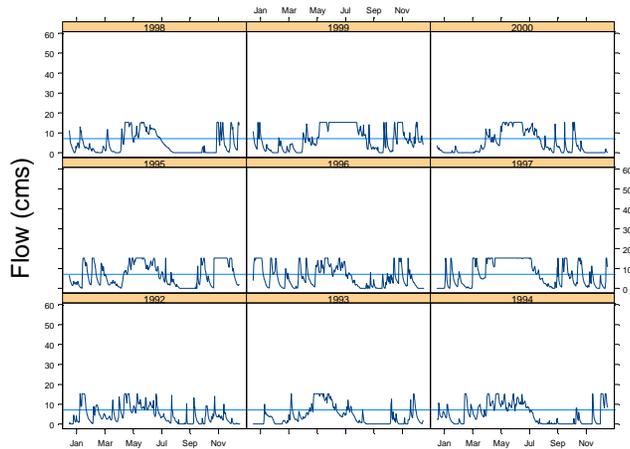
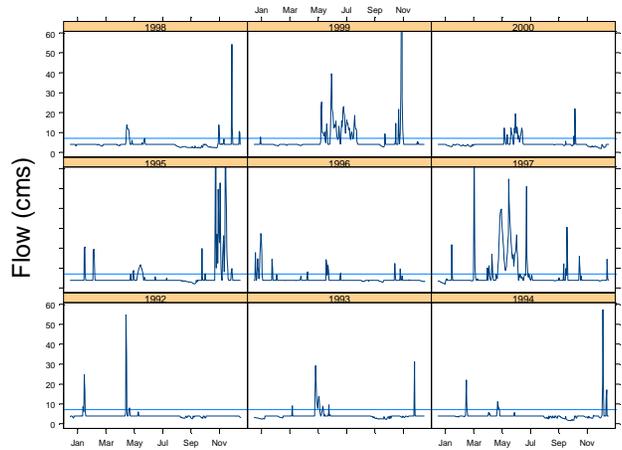
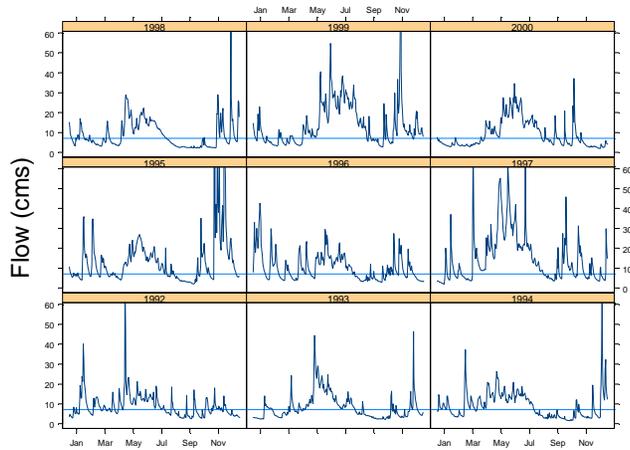
Station Name: Browns River near Courtenay
Station ID: 08HB025
Period of record: 1960-2000



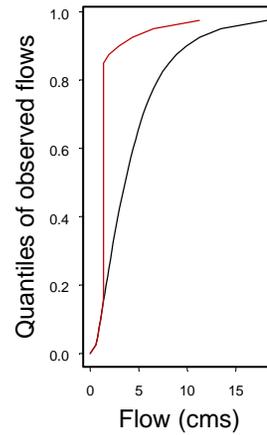
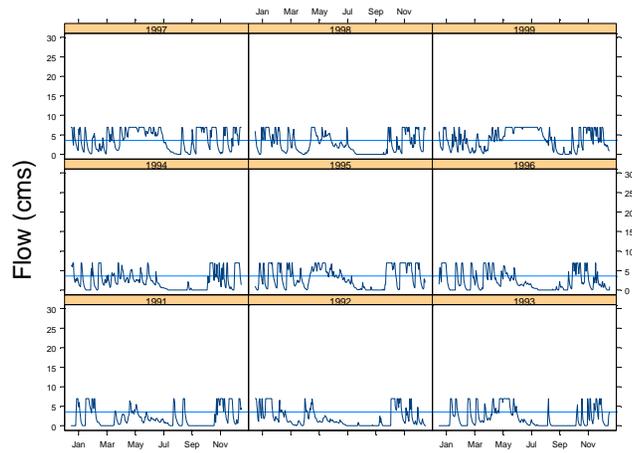
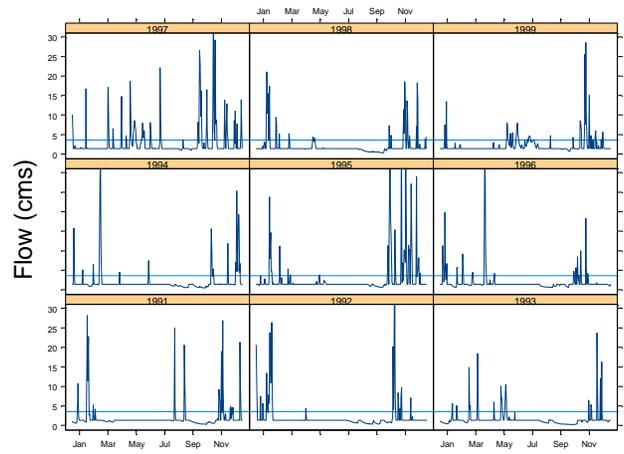
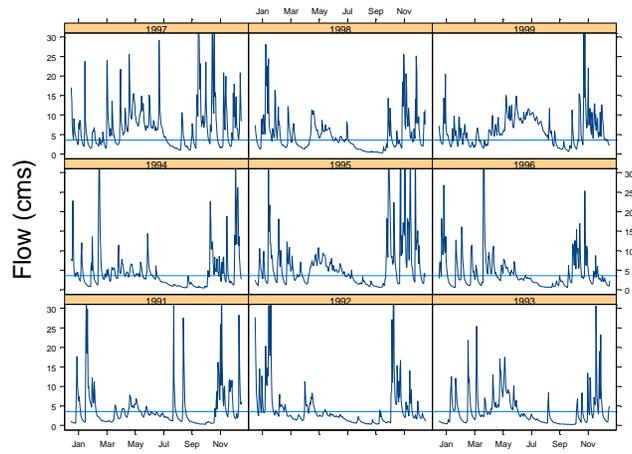
Station Name: Pallant Creek near Queen Charlotte
Station ID: 08OB002
Period of record: 1962-2000



Station Name: Slease Creek near Vedder Crossing
Station ID: 08MH056
Period of record: 1957-2000



Station Name: Heber River, Vancouver Island (immediately u/s of diversion)
Station ID: BC Hydro inflow file
Period of record: 1959 – 1999



APPENDIX F.
EVALUATION OF SIMULATED POST-PROJECT FLOWS
FOR FISHLESS STREAMS

Nineteen sites on BC streams were selected for investigating the appropriateness of different standard-setting approaches (Table A1). This appendix presents statistical comparisons of flows on the selected streams: natural flows and simulated regulated flows using the proposed flow rule for fishless streams. The comparison can be used to evaluate the performance of the proposed rule.

The statistical summaries for fish-bearing streams allowed comparisons to several existing flow criteria, but there are no equivalents for fishless streams. We therefore present only pre- and post-project summaries using RVA statistics. Whether the proposed fishless stream flow thresholds provide sufficient protection for downstream fish is ultimately a subjective decision. Our conclusion is that the recommended thresholds perform well as tools for screening proposed water uses on BC streams. For fishless streams the diversion rules allow almost ½ of available flows to be diverted on average, yet the regulated flow regime is meeting the objective of retaining key aspects of the natural hydrograph, particularly protection during low flow periods and occasional high flows for maintenance of instream habitat. For details of Methods used, please see Appendix B.

Carnation Creek

mad 0.825
 lat 48.915
 long 124.998

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.547	2.283	0.641	0.076		20
Feb	1.467	2.274	0.63	0.058		23.2
Mar	1.033	1.442	0.476	0.071		12.8
Apr	0.665	0.882	0.358	0.036		7.12
May	0.383	0.575	0.18	0.025		4.6
Jun	0.257	0.484	0.117	0.009		6.51
Jul	0.138	0.444	0.064	0.004		8.36
Aug	0.141	0.742	0.036	0.003		12.4
Sep	0.197	0.531	0.057	0.004		7.33
Oct	0.84	1.599	0.187	0.005		13.2
Nov	1.707	2.663	0.754	0.012		24.7
Dec	1.564	2.248	0.698	0.057		21.6
PoR	0.825	1.67	0.232	0.003		24.7
one_day_min	0.025	0.023	0.015	0.003	0.091	1693
three_day_min	0.026	0.023	0.016	0.0033	0.091	1638
seven_day_min	0.026	0.023	0.016	0.0037	0.091	1542
thirty_day_min	0.034	0.025	0.026	0.0067	0.097	1146
ninety_day_min	0.085	0.067	0.052	0.0108	0.316	1441
one_day_max	14.516	5.343	13.45	4.99	24.7	64
three_day_max	8.63	3.069	8.527	3.3267	15.89	142
seven_day_max	5.286	1.66	5.335	2.3933	9.281	300
thirty_day_max	2.719	0.852	2.673	1.1437	5.106	1152
ninety_day_max	1.983	0.506	1.932	1.0108	3.013	1608
julian_date_of_annual_minima	239.536	26.55	233.5	202	304	22
julian_date_of_annual_maxima	209.161	145.886	303	2	366	15
low_pulses	50.786	5.801	51	39	63	20
high_pulses	52.75	5.771	53	39	65	20
days_below_threshold	8	5.728	8.5	0	23	19
days_above_threshold	25.429	5.554	24.5	15	36	19
days_rising	102.786	8.408	103	88	124	18
days_falling	242.821	10.375	244	226	269	0
total days in period of record						10227
total years in period of record						28

fish species present chum
 coho
 chinook
 pink
 sculpin
 cutthroat
 steelhead

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	0.922	2.064	0.036	0.036	18.93	863
Feb	0.845	2.07	0.036	0.036	22.13	242
Mar	0.471	1.223	0.036	0.036	11.73	142
Apr	0.221	0.649	0.036	0.036	6.05	47
May	0.107	0.343	0.036	0.025	3.53	0
Jun	0.078	0.298	0.036	0.009	5.44	2
Jul	0.056	0.343	0.036	0.004	7.29	2
Aug	0.085	0.633	0.036	0.003	11.33	12
Sep	0.072	0.37	0.036	0.004	6.26	21
Oct	0.468	1.332	0.036	0.005	12.13	172
Nov	1.049	2.468	0.036	0.012	23.63	835
Dec	0.916	2.038	0.036	0.036	20.53	862
PoR	0.439	1.438	0.036	0.003	23.63	3200
one_day_min	0.019	0.012	0.015	0.003	0.036	510
three_day_min	0.02	0.012	0.016	0.0033	0.036	872
seven_day_min	0.02	0.012	0.016	0.0037	0.036	1530
thirty_day_min	0.024	0.01	0.025	0.0067	0.036	2237
ninety_day_min	0.034	0.019	0.03	0.0108	0.121	512
one_day_max	13.446	5.343	12.38	3.92	23.63	0
three_day_max	7.56	3.069	7.457	2.2567	14.82	0
seven_day_max	4.277	1.613	4.338	1.7191	8.211	0
thirty_day_max	1.867	0.797	1.88	0.5384	4.157	0
ninety_day_max	1.254	0.438	1.208	0.4562	2.291	0
julian_date_of_annual_minima	208.901	69.752	225.5	45	304	22
julian_date_of_annual_maxima	197.679	147.32	295	2.5	366	12
low_pulses	33.964	6.077	34.5	23	44	0
high_pulses	39.643	4.652	39.5	32	50	2
days_below_threshold	4.321	4.199	4	0	14	8
days_above_threshold	19.464	5.667	19	9	30	20
days_rising	89.393	8.879	91	69	104	0
days_falling	111.536	14.146	114	84	141	0
total days in period of record						10227
total years in period of record						28

Coquihalla below Needle Creek

mad 3.27
 lat 49.541
 long 121.106

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.65	2.07	1.12	0.47	33.5	815
Feb	1.55	1.54	1.05	0.39	17.7	707
Mar	1.72	1.5	1.14	0.39	13.3	763
Apr	3.79	3.19	2.81	0.47	22.9	690
May	9.89	5.22	8.66	1.97	34.7	626
Jun	9.26	4.9	8.47	1.89	34.1	562
Jul	3.61	2.7	2.67	0.74	14.4	708
Aug	1.13	0.63	0.96	0.46	4.93	756
Sep	0.78	0.38	0.67	0.27	3.23	720
Oct	1.22	1.52	0.77	0.25	28.6	790
Nov	2.44	3.64	1.5	0.24	47.3	784
Dec	2.11	3	1.23	0.24	46	800
PoR	3.27	4.16	1.49	0.24	47.3	8721
one_day_min	0.5	0.17	0.47	0.24	0.98	1520
three_day_min	0.51	0.18	0.48	0.24	0.99	1531
seven_day_min	0.52	0.18	0.48	0.24	1	1549
thirty_day_min	0.58	0.2	0.54	0.25	1.07	1600
ninety_day_min	0.76	0.29	0.74	0.27	1.62	1780
one_day_max	23.14	8.76	20.45	13.8	47.3	333
three_day_max	20.12	6.09	19.13	11.21	34.9	342
seven_day_max	17.42	4.57	16.91	9.93	27.34	420
thirty_day_max	12.79	3.22	12.59	7.08	18.02	797
ninety_day_max	8.36	2.04	7.83	5.09	12.52	1505
julian_date_of_annual_minima	243.68	99.17	272	41	366	19
julian_date_of_annual_maxima	151.63	62.76	141	7	363	25
low_pulses	44.39	8.83	45.5	24	58	17
high_pulses	45.04	7.67	47	26	59	19
days_below_threshold	12.71	9.44	12.5	0	32	18
days_above_threshold	14.93	4.13	14.5	7	23	19
days_rising	113.39	9.72	113	93	134	21
days_falling	235.25	14.55	238.5	199	260	0
total days in period of record						10225
total years in period of record						28

fish species present steelhead
 rainbow
 summer steelhead
 chum
 coho
 pink
 bull trout
 chinook
 Dolly Varden
 sculpin
 sockeye

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
	0.81	1.345	0.67	0.47	28.57	866
	0.71	0.634	0.67	0.39	12.77	787
	0.69	0.408	0.67	0.39	8.37	26
	1.37	1.973	0.67	0.47	17.97	120
	5.25	4.894	3.73	0.67	29.77	325
	4.75	4.455	3.54	0.67	29.17	285
	1.18	1.43	0.67	0.67	9.47	115
	0.66	0.037	0.67	0.46	0.67	868
	0.6	0.095	0.67	0.27	0.67	840
	0.64	0.854	0.67	0.25	23.67	867
	1.13	2.729	0.67	0.24	42.37	834
	0.98	2.112	0.67	0.24	41.07	861
	1.57	2.801	0.67	0.24	42.37	6794
	0.48	0.122	0.47	0.24	0.67	8458
	0.49	0.122	0.48	0.24	0.67	8278
	0.49	0.121	0.48	0.24	0.67	7991
	0.53	0.115	0.53	0.25	0.67	6882
	0.58	0.096	0.6	0.27	0.67	1784
	18.21	8.762	15.52	8.87	42.37	6
	15.19	6.087	14.2	6.28	29.97	16
	12.49	4.569	11.98	5	22.41	43
	7.9	3.16	7.66	2.45	13.08	257
	4.11	1.74	3.63	1.51	7.6	116
	238.46	92.252	266	41	366	21
	151.63	62.76	141	7	363	26
	22.75	8.893	23	8	43	0
	22.79	6.994	23	9	39	0
	9.07	8.273	8.5	0	28	11
	11.71	3.298	11.5	5	18	5
	54.75	15.062	55.5	24	86	0
	82.14	27.927	82	29	142	0
total days in period of record						10225
total years in period of record						28

Coquihalla near Hope

mad 32.1
 lat 49.375
 long 121.419

natural flows

	mean	std.dev	median	min	max	days within target range	
Jan	22.9	24.7	15.4		5	256	626
Feb	23.1	19.7	16.8		4.9	232	556
Mar	20.9	15.8	15.9		8.1	144	628
Apr	32.5	17.7	27.8		10.4	132	544
May	73.4	36.2	64.6		18.8	246	496
Jun	74.6	39.7	65.1		12.3	246	461
Jul	32.7	24.1	23.7		5.7	163	543
Aug	12.2	7.4	9.8		3.5	58	584
Sep	11.3	8.8	8.8		2.7	92	589
Oct	20	27.9	13.9		3.5	572	637
Nov	26.3	21.9	21.5		3.6	283	584
Dec	35	41	21.9		4.4	490	624
PoR	32.1	32.8	20.2		2.7	572	6872
one_day_min	5.8	2.2	5.1		2.7	12	837
three_day_min	6	2.2	5.3		3.5	12	814
seven_day_min	6.3	2.2	5.6		3.6	12	796
thirty_day_min	7.9	2.6	8		4.3	15	965
ninety_day_min	11.1	3.3	10.8		5.4	18	956
one_day_max	233.9	111.6	197		132	572	158
three_day_max	174.6	52.9	166.6		116.7	305	179
seven_day_max	137	28.7	130.4		86.7	191	218
thirty_day_max	93	27.2	88		55.2	167	763
ninety_day_max	65.1	18.2	61.7		42.7	114	1312
julian_date_of_annual_minima	245.6	77.6	262.5		9	365	19
julian_date_of_annual_maxima	190	101.2	155.5		22	361	14
low_pulses	53.9	10.7	52		42	81	16
high_pulses	54.3	10.4	50.5		42	80	17
days_below_threshold	11.9	4.8	13		0	20	15
days_above_threshold	17.7	4.4	17.5		9	26	14
days_rising	122.5	14.1	120.5		98	152	15
days_falling	231.5	18.7	239		189	256	0
total days in period of record							8035
total years in period of record							22

fish species present steelhead
 rainbow
 summer steelhead
 chum
 coho
 pink
 bull trout
 chinook
 Dolly Varden
 sculpin
 sockeye

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range	
	11	15.91	8.8		5	208.4	650
	10.2	10.36	8.8		4.9	184.4	591
	9.8	7.2	8.8		8.1	96.4	1
	10.5	7.82	8.8		8.8	84.4	0
	31.5	31.03	17		8.8	198.4	289
	33.7	33.49	17.5		8.8	198.4	0
	12.2	10.91	8.8		5.7	115.4	7
	8	1.28	8.8		3.5	10.4	7
	7.6	2.32	8.8		2.7	44.4	63
	10	21.11	8.8		3.5	524.4	655
	10.5	12.8	8.8		3.6	235.4	625
	16	31.69	8.8		4.4	442.4	595
	14.3	20.77	8.8		2.7	524.4	3483
	5.6	1.84	5.1		2.7	8.8	0
	5.8	1.73	5.3		3.5	8.8	0
	6.1	1.69	5.6		3.6	8.8	0
	6.9	1.4	7		4.3	8.8	0
	7.7	0.93	7.9		5.1	8.8	0
	186.3	111.55	149.4		84.4	524.4	346
	127.1	52.83	119		69.1	257.7	342
	89.9	28.43	82.8		39.1	143.7	456
	49.1	24.18	43		17.2	119.4	4515
	27.6	13.2	23.4		12.4	67.5	3199
	235.4	73.55	261		11.5	300	20
	189.9	101.15	155.5		22	361	17
	15.2	6.04	15.5		6	29	0
	19.3	6.76	19		5	32	0
	5.7	4.44	5		0	16	9
	11.4	3.81	11.5		5	21	5
	42.8	12.24	43.5		16	66	0
	69.1	26.42	71.5		26	151	0
total days in period of record							8035
total years in period of record							22

Skagit

mad 28.3
 lat 49.047
 long 121.096

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	13.6	13.5	10.6	2.8	147	710
Feb	13.2	12.2	9.3	2.3	108	616
Mar	11.8	6.3	11.1	2.8	43	596
Apr	30	19.4	25.4	4.2	119	564
May	77.1	38.9	67.7	21.4	267	529
Jun	84.4	43.3	80.7	16.4	289	554
Jul	41.2	30.1	33.1	7.2	205	619
Aug	14.4	8.1	12.7	4.8	61	633
Sep	9.2	5	7.9	3.9	33	636
Oct	11.7	10.6	8	3.3	80	698
Nov	15.2	15	12.4	2.5	184	705
Dec	17.5	14.4	14.3	2.7	150	683
PoR	28.3	33.2	14.9	2.3	289	7543
one_day_min	4.9	2.1	4.4	2.3	12	1728
three_day_min	5	2.1	4.5	2.3	12	1756
seven_day_min	5.2	2.2	4.6	2.4	12	1815
thirty_day_min	6.1	2.6	5.2	2.7	14	2064
ninety_day_min	8	3.6	7.3	3.7	17	2366
one_day_max	155.2	50.6	150	67.4	289	386
three_day_max	146	50.2	140.7	63.3	282	491
seven_day_max	131.9	47.7	122.1	52.6	265	717
thirty_day_max	102.4	36.8	98.1	33.4	194	1099
ninety_day_max	71.5	22	74.5	27.7	122	1613
julian_date_of_annual_minima	231.1	115.2	277	4	361	18
julian_date_of_annual_maxima	159.5	39.1	150	134	339	23
low_pulses	30.3	7.7	31	16	41	17
high_pulses	32.5	7.2	34	12	42	17
days_below_threshold	7.9	6.1	7	0	19	16
days_above_threshold	10.5	3.7	10	1	20	21
days_rising	103.7	17.7	108	42	127	20
days_falling	218	25.3	228	138	249	0

total days in period of record 9131
 total years in period of record 25

fish species present Dolly Varden
 rainbow
 cutthroat

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	7.9	6.44	7.9	2.8	104.8	756
Feb	7.3	4.25	7.9	2.3	65.8	690
Mar	7.2	1.12	7.9	2.8	7.9	775
Apr	10.2	8.4	7.9	4.2	76.8	645
May	38.8	34.9	25.5	7.9	224.8	243
Jun	45.2	39.92	38.5	7.9	246.8	163
Jul	16	20.83	7.9	7.2	162.8	0
Aug	7.7	0.96	7.9	4.8	19.2	0
Sep	6.9	1.2	7.8	3.9	7.9	64
Oct	6.8	3.04	7.9	3.3	38.2	766
Nov	7.9	7.9	7.9	2.5	141.8	733
Dec	8.1	6.21	7.9	2.7	107.8	758
PoR	14.2	21.28	7.9	2.3	246.8	5593
one_day_min	4.7	1.63	4.4	2.3	7.9	0
three_day_min	4.8	1.63	4.5	2.3	7.9	0
seven_day_min	4.9	1.67	4.6	2.4	7.9	0
thirty_day_min	5.4	1.58	5.1	2.7	7.9	0
ninety_day_min	6.1	1.31	6.3	3.7	7.9	0
one_day_max	113	50.64	107.8	25.2	246.8	465
three_day_max	103.8	50.21	98.5	21.1	239.8	383
seven_day_max	89.9	47.38	79.9	14.4	222.4	336
thirty_day_max	61.3	34.98	55.9	9.4	151.9	700
ninety_day_max	34.6	17.8	34.6	8.5	81.1	4169
julian_date_of_annual_minima	243.6	109.04	280	4	361	17
julian_date_of_annual_maxima	159.4	38.82	150	134	337.5	25
low_pulses	16.9	6.41	17	5	28	0
high_pulses	16.3	5.38	16	3	27	0
days_below_threshold	7.2	6.1	7	0	19	10
days_above_threshold	8.2	3.27	9	1	14	0
days_rising	52.5	16.01	51	9	86	0
days_falling	87.8	34.08	86	26	165	0

total days in period of record 9131
 total years in period of record 25

Bings

mad 0.472
 lat 48.789
 long 123.724

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.259	1.6242	0.716	0.068	14.8	930
Feb	1.041	1.1111	0.7	0.139	13.9	821
Mar	0.803	0.9759	0.557	0.099	13	937
Apr	0.346	0.3081	0.246	0.073	3.68	879
May	0.138	0.0903	0.113	0.022	0.696	863
Jun	0.065	0.0394	0.054	0.015	0.44	824
Jul	0.035	0.0186	0.031	0.004	0.167	810
Aug	0.026	0.0271	0.023	0.003	0.538	974
Sep	0.026	0.0175	0.022	0.002	0.147	785
Oct	0.088	0.2006	0.031	0.003	3.17	963
Nov	0.568	0.8972	0.205	0.018	7.68	879
Dec	1.285	1.4504	0.745	0.015	12	906
PoR	0.472	0.9416	0.125	0.002	14.8	10571
one_day_min	0.013	0.0065	0.012	0.002	0.025	1048
three_day_min	0.014	0.007	0.012	0.0023	0.029	1170
seven_day_min	0.015	0.0081	0.014	0.003	0.035	1473
thirty_day_min	0.019	0.0091	0.018	0.0035	0.047	1942
ninety_day_min	0.026	0.0113	0.023	0.0069	0.058	2115
one_day_max	7.654	3.6462	7	2.18	14.8	137
three_day_max	5.537	2.2294	5.183	1.6733	10.503	207
seven_day_max	3.927	1.6107	3.956	1.345	9.424	443
thirty_day_max	2.078	0.7729	2.059	0.7917	3.925	1358
ninety_day_max	1.5	0.4752	1.582	0.7886	2.473	1701
julian_date_of_annual_minima	245.409	20.4391	248.5	199	285	22
julian_date_of_annual_maxima	188.424	160.6908	79	2.5	366	16
low_pulses	31.242	14.4547	32	10	58	21
high_pulses	37.727	14.1979	40	15	66	21
days_below_threshold	4.485	4.2214	3	0	14	21
days_above_threshold	14.364	4.9486	14	4	28	24
days_rising	86.394	19.2418	86	54	133	20
days_falling	176.636	29.1417	180	128	236	0
total days in period of record						12053
total years in period of record						33

fish species present brown trout
 chun
 coho
 cutthroat
 steelhead

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	0.735	1.60E+00	0.055	0.022	14.139	1018
Feb	0.516	1.00E+00	0.039	0.022	13.239	378
Mar	0.32	9.00E-01	0.022	0.022	12.339	121
Apr	0.061	1.80E-01	0.022	0.022	3.019	3
May	0.022	4.00E-04	0.022	0.022	0.035	0
Jun	0.022	7.60E-04	0.022	0.015	0.022	0
Jul	0.021	2.90E-03	0.022	0.004	0.022	0
Aug	0.019	4.80E-03	0.022	0.003	0.022	0
Sep	0.018	5.80E-03	0.022	0.002	0.022	0
Oct	0.031	1.00E-01	0.022	0.003	2.509	20
Nov	0.278	7.40E-01	0.022	0.018	7.019	990
Dec	0.776	1.40E+00	0.084	0.015	11.339	1023
PoR	0.234	8.00E-01	0.022	0.002	14.139	3553
one_day_min	0.013	6.10E-03	0.012	0.002	0.022	844
three_day_min	0.013	6.30E-03	0.012	0.0023	0.022	903
seven_day_min	0.014	6.20E-03	0.014	0.003	0.022	1062
thirty_day_min	0.016	5.20E-03	0.018	0.0035	0.022	1496
ninety_day_min	0.019	3.70E-03	0.02	0.0069	0.022	152
one_day_max	6.993	3.60E+00	6.339	1.5188	14.139	0
three_day_max	4.876	2.20E+00	4.522	1.0121	9.842	0
seven_day_max	3.268	1.60E+00	3.32	0.6838	8.763	0
thirty_day_max	1.465	7.40E-01	1.475	0.3541	3.31	0
ninety_day_max	0.924	4.30E-01	0.996	0.2442	1.83	0
julian_date_of_annual_minima	236.691	3.70E+01	249	123.2121	278.5	33
julian_date_of_annual_maxima	188.424	1.60E+02	79	2.5	366	4
low_pulses	13.455	6.20E+00	12	5	28	0
high_pulses	19.636	7.30E+00	19	9	36	0
days_below_threshold	2.091	2.70E+00	1	0	9	3
days_above_threshold	12.212	4.10E+00	13	4	21	10
days_rising	47.091	1.20E+01	46	29	73	0
days_falling	74.121	1.60E+01	75	44	112	0
total days in period of record						12053
total years in period of record						33

Chemainus

mad 18.94
 lat 48.878
 long 123.702

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	35.45	42.83	20.85	0.091	456	1283
Feb	31.55	37	19.7	1.77	537	1189
Mar	24.82	22.96	18.85	2.7	303	1305
Apr	22.31	15.29	18.5	2.03	202	1178
May	14.98	11.45	12	1.42	86	1170
Jun	6.99	7.38	4.65	0.578	87.8	1212
Jul	2.43	2.98	1.5	0.227	49.9	1277
Aug	1.16	3.78	0.69	0.127	122	1388
Sep	1.74	3.55	0.74	0.127	66.3	1290
Oct	12.22	23.58	3.76	0.206	416	1295
Nov	33.18	43.92	19.05	0.273	374	1239
Dec	41.19	49.42	24.7	0.071	457	1275
PoR	18.94	30.75	10	0.071	537	15101
one_day_min	0.44	0.28	0.37	0.071	1.1	1884
three_day_min	0.46	0.28	0.38	0.095	1.1	1913
seven_day_min	0.49	0.29	0.43	0.138	1.3	1978
thirty_day_min	0.63	0.35	0.55	0.19	1.4	1906
ninety_day_min	1.22	0.81	0.93	0.306	4.6	1738
one_day_max	245.12	107.31	232	71.4	537	197
three_day_max	165.63	71.92	155.2	53.4	371.7	405
seven_day_max	117.47	53.69	106.94	38.386	301.9	851
thirty_day_max	65.53	25.24	60.91	22.941	149.7	1967
ninety_day_max	47.39	14.06	47.08	26.56	91.4	2610
julian_date_of_annual_minima	243.55	19.64	240	186	294	33
julian_date_of_annual_maxima	199.87	152.74	308	1	365	26
low_pulses	47.35	9.95	49	25	74	31
high_pulses	48.57	10.04	49.5	24	74	30
days_below_threshold	9.8	5.38	9	2	24	29
days_above_threshold	18.93	5.87	18	6	34	33
days_rising	112.63	11.39	112.5	91	141	30
days_falling	234.85	18.39	238	175	264	0
total days in period of record						16802
total years in period of record						46

fish species present atlantic salmon
 chinook
 chum
 coho
 cutthroat
 Dolly Varden
 pink
 rainbow
 steelhead

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	16.8	38.33	0.69	0.091	428.5	1010
Feb	12.8	32.98	0.69	0.685	509.5	963
Mar	6.4	19.07	0.69	0.685	275.5	163
Apr	4.06	10.84	0.69	0.685	174.5	121
May	2.02	5.49	0.69	0.685	58.5	52
Jun	0.93	2.60	0.69	0.578	60.3	10
Jul	0.68	0.58	0.69	0.227	22.4	1
Aug	0.65	2.56	0.68	0.127	94.5	1387
Sep	0.59	1.07	0.69	0.127	38.8	1375
Oct	4.37	17.74	0.69	0.206	388.5	1329
Nov	16.09	38.91	0.69	0.273	346.5	1069
Dec	21.14	45.49	0.69	0.071	429.5	957
PoR	7.19	25.11	0.69	0.071	509.5	8437
one_day_min	0.4	0.20	0.37	0.071	0.68	13447
three_day_min	0.41	0.19	0.38	0.095	0.68	12408
seven_day_min	0.43	0.19	0.43	0.138	0.68	10855
thirty_day_min	0.49	0.17	0.52	0.19	0.69	7194
ninety_day_min	0.58	0.11	0.62	0.293	0.71	2217
one_day_max	217.62	107.31	204.5	43.9	509.5	494
three_day_max	138.13	71.92	127.7	25.9	344.17	629
seven_day_max	90.21	53.50	79.44	13.624	274.36	775
thirty_day_max	40.98	24.07	36.46	5.239	124.61	1332
ninety_day_max	25.92	12.72	23.91	7.758	69.28	1749
julian_date_of_annual_minima	228.31	50.19	238	62.5	275	42
julian_date_of_annual_maxima	207.52	152.03	313.5	1	366	17
low_pulses	24.26	6.18	25	11	41	0
high_pulses	27.96	6.36	28.5	15	44	0
days_below_threshold	4.5	4.37	3	0	17	13
days_above_threshold	15.24	5.11	15	6	28	24
days_rising	67.33	11.28	66	42	94	0
days_falling	90.96	17.18	92.5	58	121	0
total days in period of record						16802
total years in period of record						46

Louis

mad 2.72
 lat 51.135
 long 120.123

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.69	0.33	0.61	0.142	1.89	552
Feb	0.69	0.32	0.6	0.161	2.27	452
Mar	1	0.4	0.94	0.364	3.11	547
Apr	2.47	2.32	1.61	0.3	14.7	640
May	11.22	6.45	9.66	1.4	43.3	532
Jun	8.32	6.66	5.91	0.813	36.5	577
Jul	2.77	2.13	2.22	0.32	12.5	602
Aug	1.24	1.12	1.09	0.028	12.6	692
Sep	1.08	0.73	1.01	0.068	6.09	597
Oct	1.1	0.49	1.07	0.28	4.14	536
Nov	1.12	0.53	1.01	0.362	3.27	491
Dec	0.85	0.39	0.71	0.207	2.4	541
PoR	2.72	4.36	1.13	0.028	43.3	6759
one_day_min	0.36	0.17	0.33	0.028	0.7	1124
three_day_min	0.37	0.17	0.35	0.039	0.7	1180
seven_day_min	0.4	0.18	0.36	0.066	0.73	1288
thirty_day_min	0.49	0.2	0.47	0.122	0.89	1795
ninety_day_min	0.6	0.23	0.55	0.276	1.22	2011
one_day_max	23.58	8.68	22.15	9.66	43.3	292
three_day_max	22.05	8.13	20.95	8.997	39.73	325
seven_day_max	19.81	7.2	18.03	8.716	31.51	386
thirty_day_max	13.94	4.84	12.05	6.877	22.63	621
ninety_day_max	7.91	2.8	6.92	4.116	12.75	1334
julian_date_of_annual_minima	127.08	134.09	45	2	366	18
julian_date_of_annual_maxima	141.29	13.21	141.5	120	169	16
low_pulses	48.63	17.22	49	17	85	17
high_pulses	49.75	16.11	49.5	23	84	15
days_below_threshold	11.92	11.23	8.5	0	40	18
days_above_threshold	13.92	6.04	13	5	33	20
days_rising	145	13.77	147.5	115	168	15
days_falling	189.46	22.77	190.5	148	221	1
total days in period of record						8766
total years in period of record						24

fish species present
 bull trout
 chinook
 coho
 Dolly Varden
 mountain whitefish
 sculpin
 rainbow

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	0.52	0.11	0.6	0.142	0.6	744
Feb	0.52	0.11	0.6	0.161	0.6	676
Mar	0.59	0.03	0.6	0.364	0.6	0
Apr	1.13	1.64	0.6	0.3	11.7	86
May	8.3	6.40	6.7	0.605	40.3	336
Jun	5.62	6.43	2.95	0.605	33.5	184
Jul	1.14	1.44	0.6	0.32	9.5	89
Aug	0.63	0.65	0.6	0.028	9.6	702
Sep	0.59	0.24	0.6	0.068	3.1	710
Oct	0.59	0.07	0.6	0.28	1.2	744
Nov	0.59	0.04	0.6	0.362	0.6	720
Dec	0.57	0.08	0.6	0.207	0.6	744
PoR	1.74	3.63	0.6	0.028	40.3	5735
one_day_min	0.35	0.16	0.33	0.028	0.6	7162
three_day_min	0.36	0.16	0.35	0.039	0.6	7113
seven_day_min	0.38	0.15	0.36	0.066	0.6	7012
thirty_day_min	0.45	0.14	0.47	0.122	0.6	5115
ninety_day_min	0.49	0.10	0.51	0.276	0.6	1063
one_day_max	20.62	8.68	19.19	6.7	40.3	8
three_day_max	19.09	8.13	17.99	6.037	36.8	60
seven_day_max	16.85	7.20	15.07	5.756	28.6	142
thirty_day_max	10.98	4.84	9.09	3.919	19.7	265
ninety_day_max	5.29	2.59	4.18	1.926	9.9	434
julian_date_of_annual_minima	116.77	122.27	45	2	366	7
julian_date_of_annual_maxima	141.31	13.21	141.5	120	169	24
low_pulses	19.46	10.34	19.5	6	44	0
high_pulses	17.96	9.65	15	7	41	0
days_below_threshold	8.54	10.25	4.5	0	37	5
days_above_threshold	9.71	4.21	8	3	22	3
days_rising	60.38	23.75	58	30	115	1
days_falling	72.13	27.98	65	36	141	0
total days in period of record						8766
total years in period of record						24

Lemieux

mad 3.08
 lat 51.425
 long 120.200

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.89	0.42	0.87	0.06	2.8	517
Feb	0.8	0.33	0.79	0.155	1.88	426
Mar	1.04	0.59	0.93	0.229	3.87	536
Apr	4.67	5.12	2.7	0.326	33.6	580
May	13.33	7.20	11.8	2.95	43.3	528
Jun	6.9	6.06	4.8	0.593	46.9	561
Jul	3.57	3.30	2.73	0.186	22.5	598
Aug	1.77	1.69	1.25	0.023	9.75	592
Sep	1.04	1.00	0.7	0.021	5.41	558
Oct	0.8	0.69	0.62	0.028	3.93	562
Nov	1.04	0.73	0.88	0.054	4.19	522
Dec	1.01	0.69	0.84	0.045	3.47	512
PoR	3.08	4.91	1.16	0.021	46.9	6492
one_day_min	0.31	0.18	0.32	0.021	0.76	859
three_day_min	0.32	0.18	0.32	0.021	0.78	908
seven_day_min	0.34	0.18	0.35	0.023	0.78	966
thirty_day_min	0.4	0.20	0.45	0.043	0.77	1212
ninety_day_min	0.53	0.26	0.53	0.063	0.89	1628
one_day_max	24.52	10.92	23.25	9	46.9	396
three_day_max	23.49	10.34	21.92	8.807	43.93	420
seven_day_max	21.44	8.90	19.83	8.68	38.91	443
thirty_day_max	15.48	5.60	14.31	6.241	25.81	656
ninety_day_max	8.94	3.57	7.69	3.865	18.53	1509
julian_date_of_annual_minima	201.59	134.66	264.75	1	365	12
julian_date_of_annual_maxima	134.91	12.70	135	114	165	17
low_pulses	39.05	10.88	39	20	57	14
high_pulses	39.5	10.98	39	18	58	15
days_below_threshold	10.91	9.95	7	0	37	17
days_above_threshold	10.18	4.71	10.5	2	24	16
days_rising	139.41	15.87	139.5	96	167	18
days_falling	189.23	24.27	196	144	214	1
total days in period of record						8035
total years in period of record						22

fish species present Chinook
 Coho
 Kokanee
 Rainbow
 Sockeye

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
	0.56	0.13	0.62	0.06	0.62	607
	0.56	0.12	0.62	0.155	0.62	540
	0.58	0.08	0.62	0.229	0.62	626
	2.41	4.28	0.62	0.326	29.7	617
	9.46	7.15	7.9	0.617	39.4	361
	3.69	5.62	0.9	0.593	43	270
	1.44	2.47	0.62	0.186	18.6	643
	0.69	0.72	0.62	0.023	5.85	649
	0.5	0.20	0.62	0.021	1.51	650
	0.48	0.18	0.62	0.028	0.62	620
	0.54	0.16	0.62	0.054	0.62	595
	0.55	0.15	0.62	0.045	0.62	620
	1.8	3.92	0.62	0.021	43	6798
	0.31	0.16	0.32	0.021	0.62	859
	0.32	0.17	0.32	0.021	0.62	909
	0.34	0.17	0.35	0.023	0.62	983
	0.39	0.18	0.45	0.043	0.59	1872
	0.44	0.18	0.51	0.063	0.6	4580
	20.62	10.92	19.35	5.1	43	219
	19.59	10.34	18.02	4.907	40.03	234
	17.54	8.90	15.93	4.78	35.01	255
	11.6	5.57	10.41	2.556	21.91	351
	5.53	3.24	4.38	1.598	14.63	637
	193.73	129.62	255.5	1	363	13
	134.55	12.72	133.5	114	165	17
	16.86	9.00	13.5	6	37	4
	16.32	8.95	12.5	3	36	3
	10.18	9.62	6	0	37	18
	7.18	3.76	7	1	17	13
	60.23	20.11	54.5	24	99	0
	78.55	28.87	75.5	35	146	0
total days in period of record						8035
total years in period of record						22

Similkameen above Goodfellow Ck

mad 7.9
 lat 49.086
 long 120.665

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	2.47	4.40	1.54	0.3	84.2	745
Feb	2.08	1.56	1.62	0.26	16.6	620
Mar	2.51	1.70	2.02	0.4	10.9	683
Apr	7.32	6.58	5.06	1.11	58	652
May	25.78	15.96	21.7	3.11	90.8	578
Jun	28.78	18.05	24.75	5.09	106	545
Jul	11.64	11.58	7.15	1.65	78.9	677
Aug	3.21	2.59	2.33	0.91	15.8	688
Sep	1.75	0.81	1.59	0.62	6	561
Oct	1.93	1.40	1.53	0.58	16.3	687
Nov	4.01	7.48	2	0.43	97.8	695
Dec	3.12	5.72	1.55	0.44	103	729
PoR	7.9	12.51	2.56	0.26	106	7860
one_day_min	0.71	0.24	0.74	0.26	1.2	698
three_day_min	0.77	0.24	0.74	0.27	1.2	821
seven_day_min	0.84	0.24	0.78	0.28	1.3	939
thirty_day_min	1.01	0.27	1	0.53	1.5	1154
ninety_day_min	1.28	0.42	1.28	0.7	2.3	1471
one_day_max	71.96	20.73	75.3	37.4	106	150
three_day_max	62.73	17.63	65.7	32.93	102.7	223
seven_day_max	54.86	17.22	55.93	25.66	101.5	383
thirty_day_max	37.63	10.70	36.67	17.37	66	681
ninety_day_max	23.36	7.04	22.18	12.44	40.6	1376
julian_date_of_annual_minima	192.74	151.36	279	3	366	11
julian_date_of_annual_maxima	151	16.41	151	125	182	15
low_pulses	43.48	5.97	44	30	54	16
high_pulses	45	5.39	45	34	55	17
days_below_threshold	10.2	5.99	10	3	26	18
days_above_threshold	14.12	3.72	14	9	25	16
days_rising	131.16	10.32	131	107	153	15
days_falling	222.2	12.83	219	191	254	0
total days in period of record						9131
total years in period of record						25

fish species present	Black Bullhead	Northern Pike
	Bridgelip Sucker	minnow
	Brook Trout	Rainbow Trout
	Dolly Varden	Redside Shiner
	Largescale Sucker	Sculpin (General)
	Longnose Dace	Slimy Sculpin
	Mottled Sculpin	Sucker (General)
	Mountain Whitefish	Torrent Sculpin
	Northern Mountain Sucker	Umatilla Dace
		Whitefish (General)

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	1.53	3.22	1.53	0.3	73	767
Feb	1.35	0.34	1.53	0.26	5.4	688
Mar	1.42	0.20	1.53	0.4	1.5	765
Apr	2.55	3.71	1.53	1.11	46.8	734
May	15.28	15.23	10.5	1.53	79.6	349
Jun	18.15	17.47	13.55	1.53	94.8	382
Jul	5.31	9.12	1.53	1.53	67.7	156
Aug	1.51	0.27	1.53	0.91	4.6	774
Sep	1.35	0.25	1.53	0.62	1.5	666
Oct	1.33	0.31	1.53	0.58	5.1	773
Nov	2.2	5.50	1.53	0.43	86.6	731
Dec	1.75	4.11	1.53	0.44	91.8	762
PoR	4.48	9.44	1.53	0.26	94.8	7547
one_day_min	0.71	0.24	0.74	0.26	1.2	698
three_day_min	0.77	0.24	0.74	0.27	1.2	821
seven_day_min	0.84	0.24	0.78	0.28	1.2	952
thirty_day_min	0.99	0.24	1	0.53	1.4	1428
ninety_day_min	1.13	0.23	1.19	0.7	1.5	4540
one_day_max	60.76	20.73	64.1	26.2	94.8	74
three_day_max	51.53	17.63	54.5	21.73	91.5	98
seven_day_max	43.66	17.22	44.73	14.46	90.3	136
thirty_day_max	26.44	10.68	25.47	6.41	54.8	246
ninety_day_max	13.44	6.45	11.9	4.15	29.4	384
julian_date_of_annual_minima	194.34	152.77	279	3	366	11
julian_date_of_annual_maxima	151	16.41	151	125	182	15
low_pulses	26.88	5.16	26	20	40	1
high_pulses	23.56	5.44	23	15	34	0
days_below_threshold	10.2	5.99	10	3	26	18
days_above_threshold	11.04	3.58	10	6	20	11
days_rising	80.2	14.53	78	51	103	0
days_falling	108.64	24.08	104	71	165	0
total days in period of record						9131
total years in period of record						25

Similkameen near Princeton

mad 24.34
 lat 49.460
 long 120.502

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	6	6.26	4.8	0.14	150	1676
Feb	5.8	3.83	4.6	0.79	37	1369
Mar	6.6	4.47	5.2	1.16	31.1	1580
Apr	20.4	19.16	13.6	2.15	199	1478
May	86	60.53	70.8	3.99	377	1396
Jun	95.1	59.33	82.3	11.5	430	1237
Jul	33.6	30.05	23	2.44	328	1556
Aug	9	6.34	7.3	1.76	48.1	1579
Sep	5.6	3.12	4.7	1.51	31.7	1469
Oct	6.7	6.66	5	1.67	158	1669
Nov	9.4	15.10	5.5	0.42	227	1632
Dec	7.5	9.84	4.7	1.28	202	1677
PoR	24.3	41.11	7.2	0.14	430	18318
one_day_min	2.1	0.97	2	0.14	5.4	1963
three_day_min	2.3	0.94	2.1	0.58	5.5	2251
seven_day_min	2.5	0.92	2.3	0.85	6	2707
thirty_day_min	3.2	1.06	2.9	1.63	6.8	4407
ninety_day_min	3.9	1.40	3.5	1.87	9.6	4880
one_day_max	217.1	83.77	201	56.4	430	693
three_day_max	197.9	78.87	177.5	54.27	394.3	938
seven_day_max	175.1	70.01	155.1	49.74	342.6	1235
thirty_day_max	124.1	43.05	119.1	35.74	222.2	1723
ninety_day_max	75.1	26.10	69.6	30.18	131.8	3351
julian_date_of_annual_minima	203.4	151.16	271.3	1	366	28
julian_date_of_annual_maxima	148.6	13.43	147.5	120	174	39
low_pulses	43.4	10.11	43	23	71	39
high_pulses	45.3	9.76	46	26	73	39
days_below_threshold	10.1	7.99	8	0	30	35
days_above_threshold	13.8	4.22	13.5	7	26	36
days_rising	132.4	15.05	132.5	90	164	44
days_falling	204.4	23.52	208.5	129	246	0
total days in period of record						21184
total years in period of record						58

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
	4	3.38	4.6	0.14	117.7	1792
	4	0.85	4.6	0.79	4.7	1599
	4.2	0.61	4.6	1.16	4.6	1785
	7.5	10.37	4.6	2.15	166.7	1702
	56.1	58.16	38.5	3.99	344.7	945
	64.1	57.87	50	4.6	397.7	928
	14.2	23.12	4.6	2.44	295.7	1714
	4.4	0.72	4.6	1.76	15.8	1774
	4.1	0.72	4.6	1.51	4.6	1699
	4.2	3.26	4.6	1.67	125.7	1792
	5.3	10.09	4.6	0.42	194.7	1711
	4.3	5.41	4.6	1.28	169.7	1782
	14.7	32.42	4.6	0.14	397.7	19223
	2.1	0.92	2	0.14	4.6	1963
	2.2	0.89	2.1	0.58	4.6	2258
	2.5	0.84	2.3	0.85	4.6	2770
	3.1	0.83	2.9	1.63	4.6	6210
	3.4	0.73	3.4	1.87	4.6	11846
	184.8	83.77	168.7	24.1	397.7	369
	165.6	78.87	145.2	21.97	362	461
	142.8	70.01	122.8	17.44	310.3	604
	91.9	42.85	86.8	8.33	189.9	970
	46.4	24.08	38.1	6.01	99.5	1580
	202.8	151.14	271	1	366	28
	148.6	13.43	147.5	120	174	39
	26	8.35	25	11	46	11
	23	7.56	22.5	10	46	3
	10.1	7.99	8	0	30	35
	11.3	4.06	10	4	20	30
	77.8	21.52	77	41	124	3
	102.5	30.34	105	41	170	0
total days in period of record						21184
total years in period of record						58

fish species present	Black Bullhead	Northern Pike
	Bridgelip Sucker	minnow
	Brook Trout	Rainbow Trout
	Dolly Varden	Redside Shiner
	Largescale Sucker	Sculpin (General)
	Longnose Dace	Slimy Sculpin
	Mottled Sculpin	Sucker (General)
	Mountain Whitefish	Torrent Sculpin
	Northern Mountain Sucker	Umatilla Dace
		Whitefish (General)

Big Sheep

mad 5.74
 lat 49.017
 long 117.944

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	1.09	0.96	0.76	0.24	10.2	1439
Feb	1.23	1.14	0.9	0.24	16	1292
Mar	3.22	3.47	2	0.29	27.3	1382
Apr	13.59	9.92	11.1	0.77	74.2	1213
May	27.22	11.85	25.5	4.85	72.5	1057
Jun	13.73	9.12	11.4	1.39	58.6	1106
Jul	3.43	2.71	2.55	0.67	18.7	1371
Aug	1.08	0.91	0.82	0.33	12.3	1458
Sep	0.79	0.65	0.59	0.24	7.34	1404
Oct	0.84	0.70	0.6	0.23	5.22	1410
Nov	1.27	1.21	0.77	0.2	10.3	1283
Dec	1.29	1.16	0.79	0.23	10.3	1355
PoR	5.75	9.60	1.3	0.2	74.2	15770
one_day_min	0.43	0.14	0.4	0.2	0.84	3500
three_day_min	0.45	0.15	0.4	0.23	0.87	3790
seven_day_min	0.46	0.15	0.43	0.24	0.88	3897
thirty_day_min	0.5	0.15	0.45	0.27	0.95	4261
ninety_day_min	0.59	0.23	0.54	0.29	1.47	4178
one_day_max	48.7	11.89	48.7	25.3	74.2	397
three_day_max	45.1	10.79	44.6	22.67	69.7	489
seven_day_max	40.39	9.71	38.91	18.66	60.86	712
thirty_day_max	30.09	7.22	31.73	13.83	44.78	1290
ninety_day_max	18.71	4.59	19.3	8.36	26.89	2584
julian_date_of_annual_minima	206.71	140.11	264	1	366	24
julian_date_of_annual_maxima	135.52	11.54	135	110	166	38
low_pulses	35.75	10.37	35	17	55	30
high_pulses	38.27	9.01	38	21	56	29
days_below_threshold	10.94	9.95	9	0	42	36
days_above_threshold	10.98	3.33	11	4	20	40
days_rising	120.47	15.80	119	87	150	33
days_falling	205.75	22.83	211	163	242	0

total days in period of record 18628
 total years in period of record 51

fish species present Brook Trout
 Rainbow Trout
 Kokanee

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	0.55	0.08	0.59	0.24	1.31	1579
Feb	0.56	0.22	0.59	0.24	7.11	1437
Mar	0.83	1.30	0.59	0.29	18.41	1558
Apr	6.13	8.78	2.21	0.59	65.31	545
May	18.39	11.76	16.61	0.59	63.61	765
Jun	6.26	7.89	2.51	0.59	49.71	527
Jul	0.71	0.76	0.59	0.59	9.81	56
Aug	0.58	0.11	0.59	0.33	3.41	1578
Sep	0.53	0.08	0.59	0.24	0.59	1529
Oct	0.53	0.08	0.59	0.23	0.59	1580
Nov	0.55	0.08	0.59	0.2	1.41	1529
Dec	0.55	0.08	0.59	0.23	1.41	1580
PoR	3.03	7.03	0.59	0.2	65.31	14263
one_day_min	0.42	0.12	0.4	0.2	0.59	3500
three_day_min	0.43	0.11	0.4	0.23	0.59	14710
seven_day_min	0.44	0.11	0.43	0.24	0.59	14348
thirty_day_min	0.47	0.09	0.45	0.27	0.59	13112
ninety_day_min	0.5	0.08	0.51	0.29	0.59	10825
one_day_max	39.81	11.89	39.81	16.41	65.31	137
three_day_max	36.21	10.79	35.71	13.78	60.81	193
seven_day_max	31.5	9.72	30.02	9.77	51.97	239
thirty_day_max	21.2	7.21	22.84	4.94	35.89	437
ninety_day_max	10.54	4.09	10.73	2.06	18.18	517
julian_date_of_annual_minima	205.06	129.30	254	1	366	28
julian_date_of_annual_maxima	135.5	11.50	135	110	166	38
low_pulses	19.69	8.26	17	9	49	11
high_pulses	21.31	7.96	19	9	52	5
days_below_threshold	9.02	9.17	8	0	41	34
days_above_threshold	9.04	2.54	9	3	14	37
days_rising	62.8	18.13	62	33	119	1
days_falling	85.22	26.51	84	40	171	0

total days in period of record 18628
 total years in period of record 51

Moyie

mad 19.7
 lat 49
 long 116.179

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	4.7	3.92	3.7	0.85	55.5	1992
Feb	5.2	4.91	3.9	1.25	90.3	1810
Mar	8.3	7.2	5.6	1.42	59.2	1945
Apr	37.3	29.13	29.3	2.04	173	1630
May	88.6	39.9	81.6	11.8	253	1533
Jun	55.4	35.01	48.7	6.14	207	1454
Jul	13.4	10.68	9.8	2.1	80.1	1863
Aug	3.9	2.16	3.3	1.22	20.3	1707
Sep	2.8	1.82	2.4	0.91	20.6	1961
Oct	4.1	5.24	2.6	0.85	77	2043
Nov	6.5	7.31	3.9	0.93	99.4	1894
Dec	6.2	7.31	4	0.99	87.8	2036
PoR	19.7	31.82	5.2	0.85	253	21868
one_day_min	1.7	0.55	1.6	0.85	3.4	3745
three_day_min	1.7	0.56	1.6	0.85	3.5	3891
seven_day_min	1.8	0.58	1.7	0.85	3.5	4135
thirty_day_min	2.1	0.68	2	0.99	4.6	5034
ninety_day_min	2.6	0.97	2.5	1.25	6.4	5694
one_day_max	145.3	45.63	144	40.2	253	1053
three_day_max	139	44.02	138	38.13	244.7	1190
seven_day_max	129.2	41.14	127.7	37.41	232.3	1405
thirty_day_max	99.5	29.71	99.4	33.37	160.1	2198
ninety_day_max	62.3	18.47	64.9	21.38	104.3	4070
julian_date_of_annual_minima	218.7	120.55	259	1	365	46
julian_date_of_annual_maxima	141	26.52	138	108	340	67
low_pulses	28.5	6.1	28	17	46	45
high_pulses	33	5.38	33	22	46	51
days_below_threshold	6.2	5.07	5	0	21	48
days_above_threshold	9.8	3.12	10	3	19	48
days_rising	109.3	11.39	110	86	133	46
days_falling	206.5	17.88	209	166	241	0
total days in period of record						25933
total years in period of record						71

fish species present suckers largemouth bass
 brook trout longnose dace
 brown bullhead mountain whitefish
 bull trout pumpkinseed
 cutthroat rainbow
 kokanee sculpin
 lake chub

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
	2.3	0.64	2.4	0.85	26.9	349
	2.4	1.73	2.4	1.25	61.7	364
	2.5	1.69	2.4	1.42	30.6	2176
	16.3	23.57	2.4	2.04	144.4	470
	60.1	39.69	53	2.38	224.4	529
	30.2	31.55	20.1	2.38	178.4	437
	3.1	4.03	2.4	2.1	51.5	2100
	2.3	0.27	2.4	1.22	2.4	350
	2.1	0.39	2.4	0.91	2.4	211
	2.2	1.89	2.4	0.85	48.4	210
	2.5	2.53	2.4	0.93	70.8	2095
	2.5	2.68	2.4	0.99	59.2	2159
	10.8	23.60	2.4	0.85	224.4	11450
	1.6	0.46	1.6	0.85	2.4	0
	1.7	0.45	1.6	0.85	2.4	0
	1.7	0.45	1.7	0.85	2.4	0
	1.9	0.41	2	0.99	2.4	0
	2.1	0.31	2.1	1.25	2.4	0
	116.7	45.63	115.4	11.6	224.4	1082
	110.4	44.02	109.4	9.53	216.1	1056
	100.6	41.14	99.1	8.81	203.7	1056
	70.9	29.65	70.8	5.33	131.5	1093
	36.5	16.28	37.4	3.36	75.7	2088
	214.7	117.46	258.5	1	365	49
	141	26.52	138	108	340	51
	13.3	4.81	12	4	27	1
	16.6	5.11	16	5	30	2
	3.8	4.39	3	0	18	54
	7.8	2.65	8	0	13	42
	53.2	12.36	52	32	91	0
	79.6	19.55	76	41	123	0
total days in period of record						25933
total years in period of record						71

Greta

mad 0.088
 lat 49.794
 long 119.851

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.027	0.0113	0.025	8.00E-03	0.057	570
Feb	0.027	0.0105	0.025	9.00E-03	0.056	543
Mar	0.032	0.0119	0.031	1.30E-02	0.072	630
Apr	0.085	0.0904	0.06	1.60E-02	1.08	831
May	0.403	0.4007	0.24	3.00E-02	2.48	812
Jun	0.218	0.21	0.156	1.60E-02	1.68	793
Jul	0.086	0.0627	0.074	3.00E-03	0.392	658
Aug	0.045	0.0389	0.035	1.00E-03	0.246	741
Sep	0.033	0.0241	0.028	0.00E+00	0.159	674
Oct	0.031	0.0156	0.027	6.00E-03	0.091	670
Nov	0.032	0.0151	0.028	1.00E-02	0.113	595
Dec	0.029	0.0124	0.026	9.00E-03	0.062	559
PoR	0.088	0.1745	0.037	0.00E+00	2.48	8076
one_day_min	0.015	0.0096	0.012	0.00E+00	0.04	3164
three_day_min	0.016	0.01	0.013	0.00E+00	0.04	3529
seven_day_min	0.017	0.0101	0.013	4.30E-04	0.041	3611
thirty_day_min	0.018	0.0099	0.015	2.20E-03	0.042	3685
ninety_day_min	0.021	0.0099	0.017	5.80E-03	0.045	3398
one_day_max	0.694	0.5988	0.662	5.70E-02	2.48	2037
three_day_max	0.656	0.5716	0.641	4.90E-02	2.38	2261
seven_day_max	0.589	0.5113	0.563	4.70E-02	2.076	2443
thirty_day_max	0.443	0.3806	0.371	4.20E-02	1.617	2965
ninety_day_max	0.251	0.1958	0.207	3.40E-02	0.792	3838
julian_date_of_annual_minima	162.621	123.2501	228	2.50E+00	366	20
julian_date_of_annual_maxima	137.233	10.903	137.5	1.10E+02	164	20
low_pulses	34.467	10.0575	34.5	1.70E+01	60	23
high_pulses	38.133	10.4312	38.5	1.50E+01	59	20
days_below_threshold	6.7	6.869	6	0.00E+00	20	10
days_above_threshold	10.833	6.103	10	0.00E+00	24	19
days_rising	110.6	16.4707	111	8.30E+01	138	18
days_falling	153.667	17.7226	155.5	1.20E+02	191	1
total days in period of record						10958
total years in period of record						30

fish species present brook trout
 rainbow

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	0.021	0.01	0.025	0.008	0.025	0
Feb	0.022	0.00	0.025	0.009	0.025	0
Mar	0.023	0.00	0.025	0.013	0.025	0
Apr	0.044	0.07	0.025	0.016	0.992	0
May	0.323	0.39	0.152	0.025	2.392	0
Jun	0.148	0.20	0.068	0.016	1.592	0
Jul	0.039	0.04	0.025	0.003	0.304	0
Aug	0.023	0.02	0.025	0.001	0.158	0
Sep	0.02	0.01	0.025	0	0.071	0
Oct	0.022	0.01	0.025	0.006	0.025	0
Nov	0.022	0.00	0.025	0.01	0.025	0
Dec	0.022	0.00	0.025	0.009	0.025	0
PoR	0.061	0.16	0.025	0	2.392	0
one_day_min	0.014	0.01	0.012	0	0.025	304
three_day_min	0.015	0.01	0.013	0	0.025	313
seven_day_min	0.015	0.01	0.013	0.00043	0.025	299
thirty_day_min	0.017	0.01	0.015	0.00217	0.025	287
ninety_day_min	0.018	0.01	0.017	0.00572	0.025	298
one_day_max	0.61	0.59	0.574	0.025	2.392	0
three_day_max	0.572	0.57	0.552	0.025	2.292	0
seven_day_max	0.505	0.51	0.475	0.025	1.988	0
thirty_day_max	0.361	0.37	0.283	0.025	1.529	0
ninety_day_max	0.18	0.18	0.127	0.02443	0.704	0
julian_date_of_annual_minima	173.708	117.43	237	1	358.5	19
julian_date_of_annual_maxima	135.017	14.51	136.5	94.5	164	21
low_pulses	18.3	7.53	19	8	33	5
high_pulses	18.4	8.14	16	9	32	4
days_below_threshold	6.7	6.87	6	0	20	19
days_above_threshold	7.5	4.31	7.5	0	17	14
days_rising	57.167	17.20	54	32	92	0
days_falling	80	17.25	79	51	117	0
total days in period of record						10958
total years in period of record						30

Vaseux

mad 0.953
 lat 49.249
 long 119.321

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.131	0.06	0.11	0.038	0.4	613
Feb	0.118	0.05	0.105	0.033	0.28	596
Mar	0.157	0.10	0.13	0.042	0.9	824
Apr	0.965	1.18	0.416	0.062	7.97	773
May	4.519	3.34	3.47	0.326	21.5	745
Jun	3.365	2.81	2.625	0.194	17.3	729
Jul	0.988	1.01	0.682	0.079	10.5	829
Aug	0.326	0.37	0.219	0.048	3.95	845
Sep	0.233	0.20	0.168	0.045	1.89	800
Oct	0.228	0.21	0.173	0.059	2.57	862
Nov	0.208	0.14	0.17	0.05	1.09	774
Dec	0.156	0.08	0.13	0.045	0.59	743
PoR	0.953	1.94	0.205	0.033	21.5	9133
one_day_min	0.078	0.03	0.071	0.033	0.17	2550
three_day_min	0.081	0.04	0.076	0.034	0.18	2651
seven_day_min	0.086	0.04	0.084	0.039	0.18	2858
thirty_day_min	0.098	0.04	0.087	0.049	0.19	3134
ninety_day_min	0.113	0.04	0.103	0.062	0.21	2821
one_day_max	11.638	5.16	11.2	3.88	21.5	285
three_day_max	9.916	4.36	9.768	3.107	19.3	379
seven_day_max	8.493	3.85	8.799	2.694	17.63	537
thirty_day_max	5.762	2.44	5.366	1.921	10.85	873
ninety_day_max	3.195	1.21	3.2	1.064	5.4	1744
julian_date_of_annual_minima	149.517	145.23	55.75	1	365	20
julian_date_of_annual_maxima	141.3	12.89	143	112	167	20
low_pulses	41.767	6.90	41.5	28	57	21
high_pulses	43.367	6.28	43	29	56	20
days_below_threshold	8.633	7.70	8.5	0	27	20
days_above_threshold	13.933	4.41	14	6	22	17
days_rising	132.367	12.51	130	111	162	20
days_falling	200.5	19.60	199	156	234	0
total days in period of record						10958
total years in period of record						30

fish species present Bridgelip Sucker
 Longnose Dace
 Mountain Whitefish
 Rainbow Trout
 Prickly Sculpin
 Sockeye

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	0.094	0.02	0.105	0.038	0.11	799
Feb	0.092	0.02	0.105	0.033	0.11	738
Mar	0.097	0.01	0.105	0.042	0.11	922
Apr	0.446	0.87	0.105	0.062	6.82	852
May	3.392	3.31	2.32	0.105	20.35	606
Jun	2.32	2.72	1.475	0.105	16.15	553
Jul	0.362	0.76	0.105	0.079	9.35	890
Aug	0.118	0.17	0.105	0.048	2.8	921
Sep	0.102	0.03	0.105	0.045	0.74	893
Oct	0.105	0.05	0.105	0.059	1.42	925
Nov	0.101	0.01	0.105	0.05	0.11	888
Dec	0.099	0.01	0.105	0.045	0.11	869
PoR	0.613	1.65	0.105	0.033	20.35	9856
one_day_min	0.073	0.02	0.071	0.033	0.1	8835
three_day_min	0.074	0.02	0.076	0.034	0.1	8684
seven_day_min	0.077	0.02	0.084	0.039	0.1	8464
thirty_day_min	0.084	0.02	0.087	0.049	0.11	7763
ninety_day_min	0.09	0.01	0.094	0.062	0.1	6246
one_day_max	10.488	5.16	10.05	2.73	20.35	221
three_day_max	8.766	4.36	8.618	1.957	18.15	276
seven_day_max	7.343	3.85	7.649	1.544	16.48	375
thirty_day_max	4.615	2.44	4.216	0.809	9.7	623
ninety_day_max	2.175	1.10	2.186	0.423	4.28	1199
julian_date_of_annual_minima	154.929	136.43	68.75	1	365	22
julian_date_of_annual_maxima	141.3	12.89	143	112	167	20
low_pulses	18.8	6.61	17.5	8	33	0
high_pulses	20.233	4.64	20.5	12	32	0
days_below_threshold	7.2	6.96	6.5	0	27	19
days_above_threshold	11.633	4.28	12	4	18	21
days_rising	65	20.55	58.5	40	113	0
days_falling	80.033	16.44	79	58	126	0
total days in period of record						10958
total years in period of record						30

Lingfield

mad 0.78
 lat 51.674
 long 124.142

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	0.119	0.102	0.085	0.023	0.58	681
Feb	0.087	0.048	0.065	0.03	0.37	595
Mar	0.096	0.078	0.07	0.038	0.588	723
Apr	0.396	0.576	0.18	0.042	4.47	676
May	3.121	2.432	2.585	0.15	15.7	560
Jun	3.272	2.236	2.68	0.493	14	614
Jul	1.217	1.072	0.863	0.074	7.02	691
Aug	0.353	0.519	0.219	0.034	4.67	762
Sep	0.145	0.114	0.113	0.025	1.11	673
Oct	0.211	0.419	0.13	0.02	7.31	778
Nov	0.183	0.269	0.13	0.019	3.48	748
Dec	0.125	0.096	0.105	0.019	0.69	708
PoR	0.78	1.531	0.15	0.019	15.7	8209
one_day_min	0.046	0.017	0.045	0.019	0.094	1502
three_day_min	0.048	0.017	0.047	0.019	0.095	1611
seven_day_min	0.049	0.018	0.048	0.019	0.099	1719
thirty_day_min	0.056	0.02	0.053	0.02	0.113	1870
ninety_day_min	0.074	0.034	0.062	0.039	0.184	2297
one_day_max	8.273	2.951	7.955	4.43	15.7	248
three_day_max	7.577	2.737	6.97	4.037	14.4	295
seven_day_max	6.696	2.503	6.186	3.646	13.353	386
thirty_day_max	4.487	1.454	4.039	2.456	7.949	700
ninety_day_max	2.612	0.927	2.34	1.572	5.414	1558
julian_date_of_annual_minima	192.442	137.004	247.5	2.5	366	15
julian_date_of_annual_maxima	149.423	12.669	150	129	176	16
low_pulses	34.538	5.961	33.5	22	48	19
high_pulses	36.731	6.391	36	25	49	17
days_below_threshold	5	4.907	4	0	15	13
days_above_threshold	12.962	3.28	12.5	8	19	17
days_rising	122.577	16.132	120.5	84	153	16
days_falling	200.077	28.477	208	123	249	0
total days in period of record						9497
total years in period of record						26

fish species present bull trout
 chinook
 coho
 rainbow
 steelhead

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
	0.061	0.01	0.065	0.023	0.065	0
	0.06	0.01	0.065	0.03	0.065	0
	0.06	0.01	0.065	0.038	0.065	599
	0.15	0.33	0.065	0.042	3.52	668
	2.268	2.33	1.635	0.065	14.75	473
	2.34	2.22	1.73	0.065	13.05	579
	0.52	0.92	0.065	0.065	6.07	245
	0.121	0.36	0.065	0.034	3.72	764
	0.063	0.01	0.065	0.025	0.16	740
	0.089	0.32	0.065	0.02	6.36	705
	0.078	0.15	0.065	0.019	2.53	662
	0.061	0.01	0.065	0.019	0.065	0
	0.491	1.28	0.065	0.019	14.75	5435
	0.045	0.01	0.045	0.019	0.065	7370
	0.046	0.01	0.047	0.019	0.065	7230
	0.047	0.01	0.048	0.019	0.065	7032
	0.051	0.01	0.053	0.02	0.065	5941
	0.056	0.01	0.058	0.038	0.065	850
	7.323	2.95	7.005	3.48	14.75	94
	6.628	2.74	6.02	3.087	13.45	135
	5.746	2.50	5.236	2.696	12.403	209
	3.537	1.45	3.089	1.507	7	323
	1.76	0.88	1.431	0.77	4.464	512
	191.018	127.94	210.563	2.5	366	18
	149.423	12.67	150	129	176	18
	16.538	4.99	15	10	27	0
	15.923	4.64	16	9	26	0
	3.269	4.26	1.5	0	12	15
	10.769	2.96	10	6	17	15
	53.615	17.65	49.5	29	100	0
	73.885	17.19	72	49	116	0
total days in period of record						9497
total years in period of record						26

Browns

mad 5.66
 lat 49.693
 long 125.085

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	7.24	10.588	3.36	0.38	88.9	415
Feb	5.64	7.476	3.11	0.485	66.5	394
Mar	5.49	7.019	3.25	0.614	74.9	429
Apr	7.81	6.863	6.15	1.39	52.4	401
May	10.35	6.139	9.66	1.29	50.6	337
Jun	6.78	6.611	4.42	0.222	43.1	390
Jul	2.28	4.176	0.943	0.088	24	423
Aug	1.12	3.632	0.245	0.023	54.5	444
Sep	0.74	2.808	0.255	0.05	36.2	438
Oct	6.04	12.74	1.15	0.062	183	422
Nov	8	11.378	4.1	0.191	104	411
Dec	6.45	9.347	3.26	0.56	101	418
PoR	5.66	8.45	2.75	0.023	183	4922
one_day_min	0.1	0.058	0.09	0.023	0.2	370
three_day_min	0.12	0.064	0.092	0.027	0.21	417
seven_day_min	0.13	0.069	0.101	0.039	0.25	434
thirty_day_min	0.23	0.196	0.165	0.072	0.8	604
ninety_day_min	0.78	0.719	0.465	0.124	2.5	634
one_day_max	72.01	37.325	66.5	33.1	183	74
three_day_max	43.66	15.395	45	25.133	77.6	85
seven_day_max	29.42	8.185	28.673	19.471	47.64	124
thirty_day_max	16.16	2.72	16.378	12.292	21.12	397
ninety_day_max	11.26	1.976	11.493	8.467	16.11	776
julian_date_of_annual_minima	259	24.368	266	215	301	11
julian_date_of_annual_maxima	191.8	126.069	161	17	363	9
low_pulses	51.33	7.068	52	37	61	8
high_pulses	52.27	7.196	53	39	64	8
days_below_threshold	10	5.581	9	1	19	9
days_above_threshold	21.2	5.784	19	15	31	10
days_rising	118.6	10.756	115	98	142	12
days_falling	241.07	13.274	245	209	267	0

total days in period of record 5480
 total years in period of record 15

fish species present chum
 coho
 cutthroat

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	3.08	8.63	0.245	0.245	79.84	0
Feb	1.62	5.79	0.245	0.245	57.44	0
Mar	1.51	5.41	0.245	0.245	65.84	402
Apr	2.07	5.16	0.245	0.245	43.34	368
May	3.13	4.59	0.6	0.245	41.54	155
Jun	1.95	4.31	0.245	0.222	34.04	68
Jul	0.73	2.05	0.245	0.088	14.94	436
Aug	0.4	2.58	0.245	0.023	45.44	452
Sep	0.35	1.84	0.245	0.05	27.14	443
Oct	3.01	10.74	0.245	0.062	173.94	375
Nov	3.3	9.61	0.245	0.191	94.94	343
Dec	2.35	7.57	0.245	0.245	91.94	0
PoR	1.96	6.43	0.245	0.023	173.94	3042
one_day_min	0.1	0.06	0.09	0.023	0.2	216
three_day_min	0.11	0.06	0.092	0.027	0.21	222
seven_day_min	0.12	0.07	0.101	0.039	0.23	220
thirty_day_min	0.16	0.07	0.164	0.072	0.24	214
ninety_day_min	0.22	0.08	0.197	0.121	0.47	57
one_day_max	62.95	37.33	57.44	24.04	173.94	311
three_day_max	34.6	15.40	35.94	16.073	68.54	410
seven_day_max	20.53	8.17	20.018	10.411	38.58	620
thirty_day_max	8.37	2.89	7.355	4.789	14.32	914
ninety_day_max	5.09	1.73	5.645	1.939	7.49	1723
julian_date_of_annual_minima	259	24.37	266	215	301	14
julian_date_of_annual_maxima	191.7	126.11	161	17	363	1
low_pulses	30.53	6.35	30	22	44	3
high_pulses	31.73	5.54	31	25	45	1
days_below_threshold	5.8	5.27	5	0	18	12
days_above_threshold	16.8	7.02	15	7	30	9
days_rising	74.2	8.50	75	53	89	0
days_falling	94.8	12.33	90	81	125	0

total days in period of record 5480
 total years in period of record 15

Pallant

mad 8.08
 lat 53.058
 long 132.05

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	11.02	9	8.36	1.08	63.8	676
Feb	9.65	7.01	8.09	1.31	46.9	573
Mar	7.52	4.76	6.2	1.53	36.4	651
Apr	8.27	4.91	6.92	1.91	37.4	608
May	5.83	3.63	5	1.35	26.8	614
Jun	3.96	2.74	3.21	0.66	25.4	635
Jul	2.28	1.94	1.71	0.26	18.7	692
Aug	2.33	3.04	1.25	0.21	25.1	731
Sep	5	5.42	3.29	0.12	46.6	690
Oct	13.13	9.82	10.6	0.81	93.4	654
Nov	14.16	9.08	12.4	0.82	67.7	606
Dec	13.91	9.2	12	1.51	73.7	609
PoR	8.08	7.7	5.67	0.12	93.4	7739
one_day_min	0.74	0.51	0.59	0.12	2.4	843
three_day_min	0.77	0.52	0.61	0.12	2.5	846
seven_day_min	0.83	0.54	0.7	0.13	2.6	857
thirty_day_min	1.2	0.76	0.97	0.18	3.4	1020
ninety_day_min	2.19	1.09	2.12	0.37	5.1	1284
one_day_max	49.45	14.51	45.1	32.8	93.4	106
three_day_max	40.15	11.3	38.13	26.4	70.3	170
seven_day_max	31.75	7	31.04	20.7	47.9	235
thirty_day_max	20.34	3.61	19.65	14.73	28.9	625
ninety_day_max	15.82	2.8	15.82	11.42	22	1132
julian_date_of_annual_minima	227.96	19.82	230	186	262	18
julian_date_of_annual_maxima	250.48	125.2	302.5	11	355	19
low_pulses	57.08	5	57.5	44	69	20
high_pulses	57.54	4.77	57.5	45	70	22
days_below_threshold	12.08	5.1	12.5	2	22	20
days_above_threshold	21.85	5.86	22	8	32	16
days_rising	106.31	6.56	106	93	119	16
days_falling	255.23	7.89	255.5	242	269	0
total days in period of record						9496
total years in period of record						26

fish species present chum pink
 coho rainbow
 cutthroat sockeye
 Dolly Varden steelhead
 lamprey

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
	3.67	6.05	1.25	1.08	51.2	0
	2.57	4.12	1.25	1.25	34.3	0
	1.69	2.02	1.25	1.25	23.8	0
	1.83	2.11	1.25	1.25	24.8	697
	1.39	0.90	1.25	1.25	14.2	802
	1.27	0.61	1.25	0.66	12.8	777
	1.1	0.32	1.25	0.26	6.1	805
	1.04	0.80	1.25	0.21	12.5	217
	1.58	2.54	1.25	0.12	34	42
	4.6	7.26	1.25	0.81	80.8	0
	4.66	6.94	1.25	0.82	55.1	0
	4.71	6.87	1.25	1.25	61.1	0
	2.51	4.50	1.25	0.12	80.8	3340
	0.67	0.34	0.59	0.12	1.3	0
	0.69	0.34	0.61	0.12	1.3	0
	0.73	0.34	0.7	0.13	1.3	0
	0.89	0.32	0.93	0.18	1.3	0
	1.06	0.22	1.14	0.36	1.3	0
	36.85	14.51	32.5	20.2	80.8	570
	27.55	11.30	25.53	13.8	57.7	699
	19.18	6.97	18.44	8.29	35.3	946
	8.95	3.08	8.72	3.67	16.3	1806
	5.96	1.77	5.48	3.72	10.4	3122
	221.35	25.70	225.58	150.9	262	26
	251.12	125.74	302.5	11	364	0
	15	6.08	14.5	3	28	0
	24.12	6.21	23	14	37	0
	4.5	4.04	4.5	0	13	21
	15.15	4.40	15	4	23	17
	38.96	12.28	37	24	67	0
	70.62	23.26	68	36	126	0
total days in period of record						9496
total years in period of record						26

Sleese

mad 10.1
 lat 49.063
 long 121.699

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	7.5	7.18	5.5	1.35	63.4	985
Feb	7.5	6.54	5.4	1.1	62	879
Mar	6.6	5.65	4.9	1.42	87.9	975
Apr	8.7	5.77	7.3	1.56	70	868
May	17.6	9.17	15.3	1.59	59.5	809
Jun	21.2	9.05	18.7	6.31	70.8	801
Jul	14.7	7.61	12.7	4.64	68.9	821
Aug	7	4.19	5.8	1.42	33.8	901
Sep	5	3.79	4	1.08	47.6	953
Oct	6.9	6.93	4.7	0.63	70.7	969
Nov	9.6	10.01	6.8	0.97	117	963
Dec	8.7	8.92	6	1.43	113	983
PoR	10.1	8.75	7.1	0.63	117	10907
one_day_min	2	0.58	2	0.63	3.5	716
three_day_min	2	0.59	2	0.69	3.6	752
seven_day_min	2.2	0.63	2.2	0.9	3.7	837
thirty_day_min	2.8	0.77	2.8	1.08	4.9	1052
ninety_day_min	4.4	1.13	4.3	2.03	6.2	1528
one_day_max	58.6	20.58	55.7	28.4	117	181
three_day_max	45.6	13.56	41.8	25.23	80.3	294
seven_day_max	36.1	8.65	34.4	21.4	53.5	447
thirty_day_max	25	6.73	23.9	16.36	41.7	1357
ninety_day_max	18.9	4.4	18.5	12.45	29.8	1847
julian_date_of_annual_minima	203.9	125.54	268	1	366	19
julian_date_of_annual_maxima	177.1	86.3	157	15	363	26
low_pulses	51.4	3.7	51	41	57	28
high_pulses	53.1	2.82	53	47	57	18
days_below_threshold	12	5.78	11	1	25	22
days_above_threshold	18.4	5.17	18	9	28	22
days_rising	121.8	7.99	123	101	136	22
days_falling	236.3	9.27	236	214	259	0

total days in period of record 12784
 total years in period of record 35

fish species present ?

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	4.2	3.84	4	1.35	48.2	0
Feb	4.2	3.08	4	1.1	46.8	0
Mar	4	2.80	4	1.42	72.7	0
Apr	4.2	2.30	4	1.56	54.8	18
May	6.9	6.15	4	1.59	44.3	836
Jun	8.3	7.37	4	3.96	55.6	646
Jul	5.5	4.41	4	3.96	53.7	0
Aug	3.9	0.97	4	1.42	18.6	0
Sep	3.6	1.40	4	1.08	32.4	0
Oct	3.9	3.52	4	0.63	55.5	0
Nov	5	6.91	4	0.97	101.8	0
Dec	4.7	5.69	4	1.43	97.8	0
PoR	4.9	4.71	4	0.63	101.8	1500
one_day_min	2	0.58	2	0.63	3.5	0
three_day_min	2	0.59	2	0.69	3.6	0
seven_day_min	2.2	0.62	2.2	0.9	3.6	0
thirty_day_min	2.7	0.62	2.8	1.08	3.9	0
ninety_day_min	3.3	0.46	3.4	2.01	3.9	0
one_day_max	43.4	20.58	40.5	13.2	101.8	841
three_day_max	30.5	13.54	26.6	10.03	65.1	1133
seven_day_max	21.2	8.42	19.2	7.46	38.3	1900
thirty_day_max	11.7	5.41	9.9	5.58	26.5	10274
ninety_day_max	7.6	2.75	6.6	4.5	14.9	6858
julian_date_of_annual_minima	203.9	125.54	268	1	366	27
julian_date_of_annual_maxima	193	95.43	159	15	363	7
low_pulses	29.5	6.13	29	12	42	5
high_pulses	28.3	4.60	28	19	41	1
days_below_threshold	10.8	5.57	10	1	24	29
days_above_threshold	13.1	4.53	12	5	24	25
days_rising	69.7	9.50	71	52	96	0
days_falling	108.9	18.39	110	63	164	0

total days in period of record 12784
 total years in period of record 35

Heber

mad 4.94
 lat 49.815
 long 125.986

natural flows

	mean	std.dev	median	min	max	days within target range
Jan	5.07	6.14	3.15	0	47.1	1138
Feb	4.72	4.63	3.35	0.188	43.3	1030
Mar	4.05	4.13	3.01	0.746	43.7	1175
Apr	4.64	3.42	3.77	1.25	40.2	1107
May	7.14	3.55	6.21	2.18	40.4	1002
Jun	5.96	2.76	5.32	1.5	28.7	908
Jul	4.33	2.68	3.57	0.641	29.1	990
Aug	2.14	2.21	1.55	0.215	31.9	1146
Sep	2.24	2.71	1.38	0.159	33.4	1108
Oct	6.46	8.47	3.57	0.104	64.3	1136
Nov	6.98	7.07	4.71	0	52.8	1088
Dec	5.59	6.06	3.6	0	46.1	1131
PoR	4.94	5.13	3.58	0	64.3	12959
one_day_min	0.54	0.31	0.56	0	1.6	929
three_day_min	0.58	0.31	0.6	0	1.7	958
seven_day_min	0.65	0.33	0.66	0.082	1.7	982
thirty_day_min	1.06	0.48	1.01	0.298	2.2	1143
ninety_day_min	2.06	0.8	2.03	0.754	4	1538
one_day_max	40.61	11.56	41.08	17.729	64.3	120
three_day_max	29.44	8.41	29.59	13.293	48.4	197
seven_day_max	20.74	5.6	19.6	11.264	33.9	371
thirty_day_max	11.35	2.66	10.43	6.771	18.1	1357
ninety_day_max	8.28	1.51	8.48	5.172	11.3	2319
julian_date_of_annual_minima	226.89	107.67	266	1	366	31
julian_date_of_annual_maxima	223.27	121.45	295	5	355	27
low_pulses	52.1	4.87	51	43	67	30
high_pulses	52.88	5.13	52	42	68	32
days_below_threshold	10.41	4.24	10	3	20	24
days_above_threshold	21.9	6.95	21	9	38	30
days_rising	115.63	11.18	116	94	139	28
days_falling	245.29	11.59	243	222	269	0
total days in period of record						14975
total years in period of record						41

fish species present summer steelhead
 rainbow
 Dolly Varden

regulated flows - fishless rule

	mean	std.dev	median	min	max	days within target range
Jan	2.5	4.48	1.38	0	40.1	0
Feb	2.1	3.00	1.38	0.188	36.3	0
Mar	1.85	2.83	1.38	0.746	36.7	0
Apr	1.74	2.13	1.38	1.25	33.3	1149
May	2.26	2.40	1.38	1.384	33.5	1226
Jun	1.79	1.33	1.38	1.384	21.7	1205
Jul	1.56	1.02	1.38	0.641	22.1	1191
Aug	1.28	1.11	1.38	0.215	25	120
Sep	1.25	1.28	1.38	0.159	26.5	104
Oct	3.47	6.70	1.38	0.104	57.3	79
Nov	3.33	5.52	1.38	0	45.8	1
Dec	2.68	4.38	1.38	0	39.2	0
PoR	2.15	3.58	1.38	0	57.3	5075
one_day_min	0.53	0.29	0.56	0	1.4	1
three_day_min	0.57	0.29	0.6	0	1.4	3
seven_day_min	0.64	0.30	0.66	0.082	1.4	2
thirty_day_min	0.91	0.30	0.97	0.298	1.4	0
ninety_day_min	1.18	0.22	1.24	0.64	1.7	0
one_day_max	33.65	11.56	34.12	10.771	57.3	554
three_day_max	22.49	8.39	22.63	6.493	41.5	713
seven_day_max	13.99	5.45	12.92	4.768	27	964
thirty_day_max	6.04	2.27	5.36	2.414	12.1	2008
ninety_day_max	3.92	1.21	3.43	2.276	6.4	6024
julian_date_of_annual_minima	223.16	108.07	265	1	366	34
julian_date_of_annual_maxima	221.78	123.90	294.5	5	351	2
low_pulses	21.22	4.13	22	12	33	0
high_pulses	34.9	5.06	35	24	49	12
days_below_threshold	6.39	3.70	6	0	13	39
days_above_threshold	13.22	4.38	12	5	28	32
days_rising	65.85	7.79	65	53	94	0
days_falling	103.85	17.56	101	71	147	0
total days in period of record						14975
total years in period of record						41